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The Importance of

Aluminum in Textile Technology

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THE two major fields of application of aluminum compounds are dyeing and waterproofing. Probably 90 per cent of the alum and aluminum compounds used in the textile industry today are employed in one or other of these processes. Hence due recognition of this fact is made in this account and new and recent modifications and improvements are included to indicate the probable trend of future developments.

Having previously dealt with the chemistry of Iron, Copper and Zinc and their salts from the standpoint of textile technology, (this journal, January 15th, June 4th and Aug. 27th) it is now proposed to continue with Aluminum along the same lines.

The commonest aluminum salt of commerce is alum and two varieties are obtainable, viz ammonium alum, $Al_2(SO_4)_3.(NH_4)_2SO_4.24H_2O$. and potash alum, $Al_2(SO_4)_3\ K_2SO_4\ 24H_2O$. These compounds are very similar in properties and effects but their respective solubilities in water should be noted: 100 parts of water dissolve:

	at 50 Deg. F.	at 212 Deg. F.
Ammonium Alum ..	9 parts	422 parts
Potash Alum	9.5 parts	357 parts

Both salts are slightly acid in reaction and it is important that for purposes of dyeing the product used should be free from iron. This metal may be readily detected by making an aqueous solution of the alum, adding a few drops of pure strong nitric acid followed later by a freshly prepared solution of ammonium sulfocyanide. Iron produces a red coloration.

Dyeing

In the days of dyeing by vegetable extracts, alum was essential for certain shades. Thus wool mordanted with this metal, was rendered violet by logwood, yellow by fustic and red by madder. By a judicious choice of mordants the dyer of those days was able to produce various shades.

Alum is little used today, partly because many of our synthetic dyes require no mordant at all, and partly because chrome mordanting has superseded it for most purposes. Alum, however, is occasionally used as a mordant for wool or applied after dyeing as a means of developing the shade, e.g., madder shades fast to light and milling by means of Alizarine Red (Meister, Lucius and Bruning). For the latter a bath is prepared containing 3-4 per cent vitriol, 10 per cent Glauber's salt and dyestuff and the goods entered at 122 deg. F. The contents are heated to the boil and boiled one hour. Then 5 to 10 per cent of alum according to the depth of shade required is added and boiling continued for one hour more to develop the shade.

Wool may be alum-mordanted in a bath containing 10 per cent alum, 3 per cent tartar and 2 per cent oxalic acid (half these quantities for light shades). The goods are entered, boiled 90 minutes, taken out and rinsed well. The amount of liquor in the bath needs controlling as dilution above 50 times the weight of goods, is liable to cause the precipitation of aluminum hydroxide in the liquid and not on the fiber resulting in poor fastness of the resultant shades. In dyeing the shades on wool so mordanted, an addition of 2 per cent of tanning is recommended and care must be exercised if unevenness is to be prevented. Alizarine Yellow 5G, G.G.W, Alizarine Red 3WS and Anthrol Blue of Meister, Lucius and Bruning are examples of colors suitable for this class of work.

In the dyeing of cotton, alum or aluminum may be used as a mordant to enable acid colors to be used. Generally speaking this class of dyes is of great brightness and so preferable to many direct cotton colors. The preparatory mordanting renders the process more costly in labor however, and so is little used. The fastness to washing also, is poor but since the light fastness is comparatively good, there is a limited field of application in the dyeing of cotton upholstery fabrics.

Cotton takes up but little aluminum from solutions of alum or sulfate of aluminum, so it is usual to impregnate the goods in a solution of the basic salt prepared by adding carefully 1 lb. of soda ash dissolved in water to a solution containing 6 lbs. of alum. If the mixing is conducted carefully no precipitation takes place. The solution of basic aluminum sulfate is then diluted and the goods entered and steeped cold four to five hours. They are squeezed evenly and passed into a fixing bath containing phosphate or ammonia. Fabrics so treated may then be dyed with acid colors.

An alternative mode of fixing the oxide of alumina is to pad the fabric with acetate of aluminum and then age. The unstable salt decomposes leaving basic acetate and finally the hydrated oxide on the fiber.

As already stated, dyeing processes which require a separate process of mordanting are fast becoming obsolete. Even the time-honored methods of using bichrome are threatened by the recent work of the Society Chemical Industry of Basle with their Neolan colors where the metallic ingredient is chemically united to the dyestuff molecule itself and so dyeing and mordanting are simultaneous.

On account of its being mildly acid, alum has been used for developing dyeings done with the Alkali Blue type of color. Alum is also included in many recipes of print pastes for wool.

That aluminum salts are finding new uses in dyeing and printing is clearly indicated by recent patent literature. These new processes in general bear no resemblance to the old processes already described but are interesting none the less.

Messrs. Barnes, Service, Thomas and Scottish Dyes, Ltd. claim improvements in alizarin dyeing. (Brit. Pat. No. 358,465). Red shades are obtained by applying alizarin as sulfuric acid ester attached to a B hydroxy group from a bath containing also aluminum sulfate and calcium acetate. The color is fixed by subsequent steaming. Mordanting as a separate operation is done away with.

Simultaneous dyeing and proofing is the aim of a patent by Imperial Chemical Industries and A. D. Nicholson (Brit. Pat. No. 367,864). Canvas or other fabric requiring tinting and waterproofing is treated with a colloidal solution containing an aluminum soap (e.g., stearate) in an organic solvent into which has been incorporated a vat color, e.g., Caledon Jade Green. After impregnation the solvent is removed and resulting fabric is claimed to be showerproof and possessed of color which is fast to light and not easily rubbed off.

Aluminum chlorate is proposed as a three-purpose developer of dyeings and printings of leuco vat ester salts by Durand and Huguenin of Basle (Brit. Pat. No. 356,577). Previously it had been usual to employ three products: an oxidizing agent, e.g., sodium chlorate, an acid-yielding product, e.g., ammonium sulfocyanide, and a catalyst for promoting oxidation. In the above patent aluminum chlorate is claimed to replace all three and give better and brighter tones.

A further improvement is described by the above firm in Brit. Pat. No. 372,224, where they state that the use of an acid salt along with the aluminum chlorate enables complete development of the ester salt to be obtained without steaming, merely by drying. The salt they recommend is aluminum sulfate.

It is a well-known fact that contamination of dye liquors or print pastes by iron leads to the resulting shade being rendered dull. In the application of alizarin dyes for pink shades, O. Scheurer claims to avoid saddening by adding to each kilogram of print paste 150-200 gms. of a gelatinous Solution of Aluminum hydroxide, (Bull. Soc. Ind. Mulhouse, 1927, 93, 123) before or during printing, that such a practice is of doubtful advantage is noted by Binder, the reporter.

A new method of resisting azoic dyeing involving the use of aluminum formate is indicative of the unlooked-for properties of salts of this metal. (James Hardcastle & Co., Manchester, and Parker, Wall and Farrington, Brit. Pat. No. 405,005). Prior to dyeing, the fabric is treated with a "passive component", a paste containing the aluminum salt of an acid which does not promote tendering such as aluminum formate or acetate. Goods may then be stored indefinitely without effecting the resist. If multicolor effects are desired, the process may be combined with the application of aniline black, Rapidogen, or rapid fast dyestuffs.

Brit. Pat. No. 335,206 of British Celanese and Wainwright describes the production of "photographic" effects on cellulose esters by roller printing. Their mention of a pre-impregnation of the fabric in aluminum acetate "to increase sharpness of definition" is suggestive of other possibilities in this direction and is worthy of note.

Waterproofing

This is a process wherein, as already stated, aluminum salts and aluminum soaps are of the greatest importance. Unlike dyeing where aluminum salts are now not used as much as formerly, in proofing they are still in vogue and even the very latest patents are concerned with their utilization. The basis of most methods of waterproofing is that of precipitating within the fiber by double impregnation, the insoluble aluminum soap. The variations on this, are, however, extremely numerous and a consideration of a few recent patents may show what progress is being made.

The aim of many recent processes is to obtain a proof without injuring the handle and draping quality of the goods. Thus woolen material is treated in an aqueous emulsion containing soap and olive oil, then in a solution of salts, the hydroxides and carbonate of which are insoluble in water, for example aluminum formate. After that the goods are heated at 60 to 80 deg. C. (Brit. Pat. No. 338,391). This treatment is claimed not to spoil the handle and appearance of the fabric.

A new and original departure in proofing technique is

indicated in Brit. Pat. No. 408,985 (1934). Here the wool to be impregnated is first given an oxidizing treatment with chlorine or hydrogen peroxide, for example in an acidified bleach liquor. This is followed by immersion in aluminium acetate 6 deg. Tw, and later in one per cent soap and emulsified wax. Goods so treated are of remarkable fastness to water and free from any disagreeable matted appearance.

Proofing may be carried out on viscose rayon by direct impregnation with an aluminum soap dissolved in a solvent such as trichlorethylene. According to a patent of Bemberg Co. (Brit. Pat. No. 286,257) 2 kgm. of aluminum soap made from tallow and containing 9.6 per cent Al_2O_3 are dissolved in 100 kgm. of trichlorethylene. 4 kgm. of rayon are treated for 15 minutes in the warm solution and the solvent is driven off.

A still further variation in proofing processes is illustrated by that of Brit. Pat. No. 242,240 of Hawlik. Here viscose is treated with aluminum in the actual process of spinning and so no special impregnation is necessary. The alkali cellulose contains sodium aluminate in solution and is brought through nozzles into a coagulating bath containing sulfuric acid and sulfo-ricinic acid or aluminum sulfate.

Having dealt with the two principal fields in which aluminum salts are employed in textile processes, it is now proposed to consider other and more obscure uses. These are possibly of little direct practical value but at least are suggestive to the thoughtful chemist or technologist.

Scouring and Bleaching

Alkaline aluminates have been proposed for use in scouring and bleaching baths for textile materials having cellulose base by Watremez (Brit. Pat. No. 231,454). The bath comprises a mixture of ordinary scouring agent, (for example caustic soda in presence of alkaline hypochlorite) together with the mixture obtained by dissolving a hot concentrated solution of an alkaline salt, (for example, soda ash) with a metal oxide, (for example Al_2O_3) which does not form an insoluble compound when dissolved in the said solution. The aluminate is in all probability included as a buffer to modify the intensity of the alkali in much the same way as silicate is added to scouring liquors according to modern day practices, i.e., as a builder, (See Snell's work, Ind. & Eng. Chem., 1932).

Carbonizing

Aluminum chloride is a somewhat unstable salt and on heating is hydrolyzed in the presence of water to give a basic chloride and free hydrochloric acid. Hence the substance may be used for carbonizing purposes and its action is milder than sulfuric acid. According to a recent patent it is suitable for destroying cotton in mixtures of cotton and cellulose acetate. Thus H. Dreyfus recommends (Brit. Pat. No. 339,300) heating the fabric in a solution of aluminum chloride and sulfate. The disintegrated cotton threads are then removed by washing and brushing.

Versus Wool Shrinkage

Means of reducing the shrinkage of wool are much sought after. Brit. Pat. No. 290,805, of the Yorkshire Dyeware and Chemical Co., Ltd. describes a method of treating loose wool, yarn, or fabric with basic salts of chromium and aluminum which has a marked effect in diminishing shrinkage in subsequent washing. In principle, the process is analogous to the tanning of leather. Alum-tanned wool has the advantage over chrome tanned of being white in color.

Delustering

The delustering of rayon may be achieved in a great variety of ways and the use of aluminum sulfate-formate is described in Brit. Pat. No. 400,244 of the Imperial Chemical Industry, L. G. Laurie and H. D. Mudford. The resultant fiber has a pleasing, soft, subdued luster and attractive handle.

Oxides of aluminum are mentioned together with those of titanium, tin, silicon, zinc, cerium, etc., in Brit. Pat. No. 343,121, 1929, applied in colloidal solution for treating materials made of or containing cellulose ethers they deluster, weight, and make resistant to hot ironing. Aluminum oxide is also mentioned in U. S. Pat. No. 1,870,407, 1932, as well as other insoluble compounds in the same connection.

Raising the Safe Ironing Point

The resistance to heat of goods formed of or containing thermoplastic materials such as acetate silks is improved by the presence within the fiber of an aluminum compound. (U. S. Pat. No. 1,897,712, 1933 to H. Platt and C. M. Croft, assigned to the Celanese Corporation of America). The goods are treated with basic aluminum acetate acidified with acetic acid or containing ammonium thiocyanate at 40 deg. C. for 45 minutes. The same process confers waterproof properties and its luster is not increased by the heat treatment.

Aluminum Paint

A practical instance of the all-round utility of aluminum is afforded by a brief consideration of its application in paint. As the result of careful experiments, Messrs. Edwards and Wray, (Ind. and Eng. Chem., 1925 and 1927) showed that light transmission through a linseed oil-aluminum paint containing 21 per cent of the metal was zero, and that the moisture proofing efficiency was very high indeed. A surface covered with the paint is very smooth and radiates heat slowly. It is very inert and will withstand the action of chlorine. In mill practice it is suitable for covering woodwork or metal and is often used on pipes and tanks. For outside work too it is useful on account of its being impervious to light and ultra-violet, it will stand up to strong sunshine. It is not affected or discolored by heat.

Cause of

Excessive Dye Variations*

Encountered in Fabrics Containing "Cable Twist" Yarn

By B. L. HATHORNE
Textile Consultant

MANY pleasing fabrics have been produced during the past two years by utilizing crepe yarns consisting of acetate doubled over viscose crepe. These yarns have appeared in many popular constructions, most of which have caused dyers many headaches due to excessive warp-streaks and filling changes.

In most cases, after many trials, the dyer has simply stated that these troubles are due to the construction and nature of the yarn, without delving any further into the actual cause and possible cure.

Unfortunately, from the viewpoint of both dyer and weaver, excessive dye troubles have detracted considerably from the value of the process fabric and have in turn forced a reduction in the selling price of the greige fabric and curtailed the life of many of these fabrics that might otherwise have become important yardage numbers.

The throwster was in most cases blamed by the dyer for the trouble, it being the dyer's opinion that uneven twist, etc., was the true cause of the fault. After checking into many such fabrics the throwsters convinced themselves that these yarns were relatively uniform with respect to twist, count, etc.

Throwsters, then, passed the trouble back to the designer, stating that the nature of the fabric was such that it could not be produced uniformly.

The writer was recently requested to examine a substantial quantity of merchandise containing acetate doubled-over viscose crepe and to determine the cause of the excessive color-changes observed in the finished fabric.

Whereas the fabric contained the usual number of throwing variations, some of which contributed in part to the variations observed, particularly when the fabric was dyed into a cross-dye effect thus accentuating such differences that occurred during the doubling action, nevertheless, it was evident that very early in the investigation that throwing variations could not be responsible for the extreme color variations noted in the fabric.

A detailed description of all the tests made in conjunction with this problem would be meaningless and unnecessarily boresome insofar as this article is concerned. However, one part of the work produced such startling results that a detailed description of the exact manner in which results were obtained may be of interest and value to those who have encountered, and may in the future encounter, similar problems.

Rather than theorizing upon the probable cause of the phenomenon observed, and lacking as yet conclusive proof of the cause, the information can best be presented by a simple outline of the work that clearly establishes proof of a phenomenon of acetate dyeing hithertofore unknown by most people handling this fiber in commercial dye plants.

Proof of the facts found was produced in the following manner:—

1—12 skeins of acetate rayon of well-known type were obtained from the manufacturer.

2—Yarn from each skein was wound in equal quantity upon three steaming spools of the type used in throwing plants—1/3 of a skein was wound on each spool. The spools were marked separately for later identification.

3—24 of the spools, two from each skein, were placed in a Mertz vacuum steamer and were subjected to two five-minute steam treatments (temperature of steam, 180 degrees Fahrenheit — temperature of water, 160 degrees Fahrenheit).

4—12 of the spools, one from each skein, were removed from the steamer.

5—The remaining 12 skeins were steamed for two additional 5-minute periods, the same temperature being maintained.

6—All the yarn was coned, care being taken that cones were marked the same way as the spools from which the cones were taken.

7—The entire 36 cones were then knit on a circular knit hosiery machine continuously, the individual

* This is the second in a series of articles submitted by members of the Rayon Sub-Commi ttee of the A.A.T.C.C.

swatches being separated by two rows of mercerized cotton, the group of swatches being separated by a larger amount of cotton.

The continuous tube produced, as described above, was then dyed in a bath containing yellow, red and blue acetate dyestuffs, in such proportions that a reddish-brown shade was produced. The fabric was entered into this dye-bath dry and was worked for one hour. The starting temperature was 100 degrees Fahrenheit, the bath being slowly raised to 180 degrees at three-quarters of an hour and held at 180 degrees for fifteen minutes.

Examination of the finished fabric disclosed the startling fact that the yarn that had been steamed for two five-minute periods and for the four five-minute periods had absorbed only approximately half as much dyestuff as the yarn which had not been steamed at all, and that the color varied considerably from swatch to swatch of the steamed portions of the fabric due to the action of the steam.

In order to determine, at least roughly, whether or not the phenomenon was due to the fact that the yarn was under some tension on the spools and therefore, stretched due to the increased plasticity of the acetate on the application of steam, several skeins were knit into long continuous tubes, which were then cut into thirds, 1/3 being unsteamed, 1/3 being given two 5-minute steamings, and the last 1/3 being given four 5-minute steamings. Afterwards all the fabrics were entered dry into the dye-bath and dyed as heretofore.

Examination of the dye swatches showed that the steamed swatches dyed much less heavily than those not exposed to the steaming process.

At this writing, insufficient work has been done to enable the writer to state with accuracy as to whether or not the variations from skein to skein that were observed in the first experiment are, or are not, in part a result of such tension variations as may have been applied to the yarn during winding. This point will be determined and reported on at a later date.

Having determined that a uniform quantity of steam applied to acetate rayon, according to accepted throwster practice causes a yarn to vary with respect to dye affinity after steaming, the next step was to determine whether or not a special boil-off procedure could be devised that would reduce or overcome the effect of the steaming operation.

A detailed series of experiments that need not be reported in full here produced the pleasing and surprising fact that treating greige fabric in two to three per cent soap solution just under the boil for three hours completely offsets the variation caused during the steaming operation.

Dyeing Feathers For Toy Making

By **EGOR GRUNEOID**

A VAST amount of capital has been sunk in toy-making plants and in some instances the dyers' art is in demand for coloring the various materials consumed by the toy manufacturer. Dyed and bleached feathers have always found a use in making a variety of toys ranging from the gaudy shuttlecock to the befeathered headdress of the juvenile Indian warrior outfit.

Pen feathers from the wings and tails of domestic fowls and ducks are principally used by the toy manufacturers. White plumage proves the most useful variety since the gaudy hues generally wanted for toys are processed more easily than where the stock is of the colored variety.

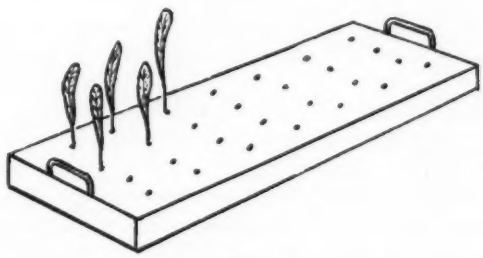

Fig. 1

In order to avoid distorting the feathers during processing in hot liquor, the stock is handled in frames and clamps similar to those depicted in Figs. 1 and 2. In the first example, the apparatus consists of a rectangular

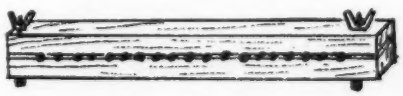

Fig. 2

shaped stainless metal block, perforated with a number of holes for the insertion of the feather butts. These blocks commonly hold several gross of feathers, spaced about half an inch apart in "staggered" formation. The loaded blocks are handled by the grips at each end.

When the feathers are to be processed, the block and its contents are lowered into a shallow trough containing the dye and there left to steep until the process is complete.

Perhaps a better form of this apparatus utilizes a disc-

shaped block which can be slowly rotated on a central spindle while it is contained in a flat position in a circular trough or dye kettle. Feathers can be very levelly dyed in this apparatus. The disc containing the feathers is generally rotated by an electric motor which is coupled through a worm gear to the disc shaft.

The clamp illustrated in Fig. 2 is an easily contrived piece of apparatus for processing feathers. The device consists of two lengths of hardwood timber suitably grooved at intervals at the contacting surface for the feather butts. When these have been inserted, the end clamps are tightened by means of the two thumbscrews. After a number of loaded clamps have been prepared, their contents are processed by steeping them in a shallow kettle, the clamping bars, however, resting across the rim of the receptacle. By this means, it is an easy matter to manipulate the separate clamps of feathers and so produce level colors. The jaws of the clamps are sometimes faced with serrated rubber in order to grip the butts without damage.

Bleaching, scouring and dyeing of the feathers may be done in any of the apparatus mentioned in the present article. Scouring generally consists of little more than degreasing unless the feathers are very dirty. Cleansing is usually done in a warm bath containing ammonium carbonate to which is sometimes added a little soap if the stock is badly soiled. Bleaching is carried out with peroxide of hydrogen in the manner usual when processing with this chemical. In the ordinary way, bleaching of the stock before coloring is unnecessary; moreover, the extra process can seldom be contemplated for cheap grade feathers for use in cut-line toys.

Acid and basic colors are chiefly used for dyeing the feathers. With acid colors, processing is done at the boil in a bath containing sulfuric acid. For the cheapest grade work, the stock is simply steeped for a few minutes in a hot neutral solution of the appropriate basic dye, then lightly rinsed and dried, frequently without removing the feathers from the blocks or clamps.

● DU PONT EXHIBIT

"Garments for Industry" is the theme of one of the current Boardwalk window displays at the Du Pont Exhibit in Atlantic City. It features coveralls, jackets, trousers, caps, etc., dyed with du Pont dyestuffs, and worn by attendants of leading oil stations and employes of various industrial concerns. The fabrics are from Gregg Dyeing Co., Grantville, S. C., and Sibley Mfg. Co., Augusta, Ga. McCampbell & Co., Inc., New York City, are selling agents for the fabrics.

The background for the display is striking. In the foreground, is a scene of a typical service station, which has been painted on Cel-O-Glass, eight by eight feet in size. To one side of the station and a little to the rear appears a refinery, while to the rear, and stretching off in the distance, is an oil field with the derricks rising in the distance and a range of hills overlooking the whole scene. The entire background is in high colors and is lighted from the rear, producing a most unusual window setting.

Garments bearing the name and insignia of oil and industrial concerns are shown throughout the window.

The contributing garment manufacturers include H. D. Lee Mercantile Co.; Cowden Mrg. Co.; Sweet-Orr & Co.; Unitog Mfg. Co.; Globe Superior Co.; Eloesser-Heynemann Co.; and Riverside Mfg. Co.

● SANDOZ SAMPLES

The Sandoz Chemical Works has announced the following releases, copies of which are available on request:

Artisil Direct Colors—on acetate yarn and piece goods. Included in this booklet are general dyeing instructions and special instructions for the following: rayon-acetate mixtures, cotton-acetate mixtures, acetate effect threads in cotton or rayon pieces, contrasting shades on acetate-cotton and acetate-rayon mixtures, real silk-acetate mixtures, wool-acetate mixtures, acetate effect threads in woolen pieces and acetate effect threads in real silk pieces. Samples of dyeings are shown for the various colors in this classification. A fastness table for Artisil Direct Colors is also included.

Alizarine Milling Blue SL — there are two sample cards under this title one of which is for silk and the other for wool. It is claimed that the fastness properties of this dyestuff on natural silk in regard to light, water and washing surpass those of other blues for this fiber. In combination with other recommended colors this dyestuff is said to be particularly interesting for the production of mode shades. While this dyestuff is suitable for sewing silk it is not recommended for mixed fabrics as both cotton and viscose are stained. On wool this dye may be used as an acid or as a chrome color. It is stated that because of its all around fastness properties this product should be of great value in the fine worsted section of the trade, where it is suitable for the dyeing of loose wool, slubbing and yarn, and also for the shading of chrome colors by any method.

● INCO

No. 3 of Vol. XII of Inco, publication of the International Nickel Company has just been distributed. It contains articles and illustrations depicting the use of its products in industry. Copies are available upon request.

Technical Notes From Foreign Sources

pH -Number and its Importance for the Textile Industry

Justin Hausner—Monats. f. Textile-Ind., 48, 129 (1932).—The first part of a paper under the above now standardized title. There is nothing new in this section.

Vat Dyestuffs (Anthraquinone Series)

German Patent No. 465,835 (26/*IX*/'28)—*I. G. Farben-Ind. A. G.*—German Patent No. 239,544 mentions the fact that dianthraquinonylamines, which possess an acylamino group in each of the anthraquinone radicals, can be transformed into carbazole derivatives by treatment with concentrated sulfuric acid at a comparatively low temperature. If only one acylamino group is present in the dianthraquinonylamine, this carbazole condensation takes place much more difficulty, e. g., by heating with anhydrous aluminium chloride at elevated temperatures (German Patent No. 451,495). In this case, dianthraquinonylamines which possess at least one acridone ring, and at least one acylamino group, or substitution products of such compounds, can be condensed quite easily, by use of concentrated sulfuric acid at only moderate temperatures. The products are already vat dyestuffs; they may be further modified in some cases by subsequent oxidation.

One example is given; the product dyes cotton a fast olive-brown.

Prevention of Bacterial Damage of Wool

German Patent No. 463,472 (28/*VII*/'28)—*I. G. Farben-Ind. A. G.*—This method consists in the treatment of the wool, before or after washing, fulling, etc., with a solution of a sulfonic acid of an alkylated naphthalene (in the one example, 50 kilos of wool are treated, immediately after the usual washing, in a bath containing 12.5 kilos of dibutyl-naphthalene-sulfonic acid per 1200 liters, for one hour, at 50° C., then rinsed. The alkali salts of such acids do not seem to have the same effect. The substances are very soluble in water; as the impregnation loses its value, therefore, on subsequent washing or alkaline treatment, the process claims to be of value only to protect the wool from bacterial damage while it is lying in the wet state, awaiting further working up.

Vat Dyestuffs (Coeramidonines)

German Patent No. 465,434 (19/*IX*/'28)—*I. G. Farben-Ind. A. G.*—According to German Patent No. 126,444, 1-arylido-anthraquinones are converted to coeramidonines by vigorous treatment with condensing agents, such as anhydrous zinc chloride in glacial acetic acid, strong sulfuric acid, or fused phosphoric acid, temperatures of at least 150° C. being required. The present patent covers the condensation of 2-amino-1-arylido-anthraquinones or their substitution products at a lower temperature, and the sulfonation, if desired, of the 2-amino-coeramidonines produced.

Five examples are given.

Omega-Sulfonic acids of Diamino-anthraquinones

German Patent No. 462,041 (5/*VII*/'28)—*British Dyestuffs Corp. Ltd.*—By acting upon finely divided 1-4- or 1-8-diamino-anthraquinones with formaldehyde-bisulfite, in the absence of mineral acids, the process proceeds smoothly. Two examples are given.

Triphenyl-methane Dyestuffs

German Patent No. 465,508 (19/*IX*/'28)—*I. G. Farben-Ind. A. G.*—The dyestuffs here considered belong to the specially valuable group of basics containing a chlorine atom ortho to the linkage to the methane carbon. They have up to the present been prepared by the use of o-chlorbenzaldehyde, an expensive intermediate and tedious to prepare, condensing it with dialkyl-anilines or mono-alkyl o-toluidines, the product being then oxidized. The present method condenses 4-4'-tetra-alkyl-diamino-benzhydrol (Michler's hydrol) with 1-2-4-trichlorbenzene, and oxidizes the base so formed.

One example is given, the product dyeing silk a clear bluish-green.

Basic Dyestuffs (After-chroming Triphenylmethane)

German Patent No. 465,507 (19/*IX*/'28)—*I. G. Farben-Ind. A. G.*—It has long been known that aromatic aldehydes will condense not only with two molecules of amines, the same or different, and with phenols, two molecules the same or different, to establish the triphenylmethane complex, some of the products having long been known and used as standard dyestuffs; but also, that such aldehydes will condense with two molecules of o-hydroxy-carbonic acids as phenols, the two hydroxy-acid molecules being, as before, the same or different, to form the leuco-compounds of dyestuffs not basic, which are capable of being after-chromed but usually of low value. The usual method, however, depending upon the carbon atom of an aldehyde group for establishment of the triphenylmethane linkage, is not at all convenient in this case. The present patent involves the use of such as aldehyde with one molecule of an o-hydroxy-carbonic acid and one molecule of a secondary or tertially amine, the leuco-compound produced being then oxidized to the dyestuff, which is capable of being after-chromed by virtue of the o-hydroxy-carbonic grouping, the usual quinonoid structure of the triphenylmethane dyestuffs presumably being established on the basic angle of the molecule. The process can be carried out either by condensing the three components simultaneously, or by condensing the aldehyde with one component to a hydrol, and then condensing this with the third component to the leuco-base.

Three examples are given: the first product dyes wool directly a gray-blue violet, going over to a pure greenish-blue by after-chroming, the second dyeing wool a dull

yellow, going over to a green, and the third dyeing wool a red-brown, going over, upon after-chroming to a reddish-blue.

Vat Dyestuffs

German Patent No. 463,246 (*26/VII/*'28) (*addition to G. P. No.* 301,554 *of 7/X/*'14)—*I. G. Farben-Ind. A. G.*—Other patents are involved. German Patent No. 255,641 covers the production of certain yellow vat dyestuffs, No. 301,554 covers the treatment of these dyestuffs, and of their nuclearly substituted derivatives, as their alkali salts, with alkylating agents, No. 302,259 covers the further alkylation of these partly alkylated products by the same method, the products finally containing different alkyl groups in the same molecule. The present extension goes still further in the same direction, alkylating any of the above products in the absence of neutralizing substances. Chiefly, the substances are heated with alkyl sulfates alone, or in mixture with concentrated sulfuric acid, or by mixing substance, an alcohol, and sulfuric acid, and then heating. No organic solvents or media are needed. Three examples are given.

Vat Dyestuffs (Benzanthrone Series)

German Patent No. 456,506 (*28/IX/*'28)—*I. G. Farben-Ind. A. G.*—The process here covered consists in the treatment of bz-1-nitro-2-methyl-benzanthrone with fuming sulfuric acid of 60%, stirring for a short time at 10° C, followed by dilution with 90% sulfuric acid at 10°-20° C., then pouring upon ice and filtering off and washing the product. It is purified by boiling out with dilute caustic soda.

Its vat is bluish-red, and dyes cotton in gray tones of good fastness.

Study of Solutions of Substantive Colors

M. Lesbre—TIBA 10, 483 (1932).—Previous parts of this paper have already been reviewed. The present section deals with the variation, in absorption of light, of solutions of substantive dyestuffs, at constant temperatures and varying dilutions, and at constant dilution and varying temperatures. This matter has already been studied by different workers, from different angles. Dahn found that, e.g., in very dilute solutions, which showed only a very faint color, this color gradually disappeared in course of time, this being explained, D. thought, by the assumption of causes purely external, such as adsorption of the dyestuff by the surface of the glass container, bleaching by the daylight, traces of ammonia or carbon dioxide in the atmosphere, etc. Formanek and Grandmougin have observed that the intensity, and even the position of the absorption bands of aqueous solutions of dyestuffs do not remain constant with time, the principal variations being met with during the first few hours of existence in solution. Their conclusion was, that a certain length of time is required for the substance in solution to adjust itself to the new concentration, i.e., that dilution is considerably more than a mere "thinning down" of a solution. Holmes and French have recorded the irregularities which they came upon in their determinative study of dyestuffs in solution. They attributed the slight differences which they observed in the absorption spectra of solutions of the same concentration to the effect of very slight variations in temperature, and the differences were very slight, as they apparently did not work with solutions as soon as prepared, but with those which had been prepared and allowed to stand for some time before examination. There, therefore, might have been variations of state which are mostly all over before observation, but really existent for a time soon after making up of the solutions. (This seems an important point to raise.) Gordon has laid most weight, in his work, upon the quality of the solvent. He used distilled water, and ascribed the variations met with by other workers to the use of common water, therefore containing various salts in solution. He remarked that colorimetric observations do not give rigorously concordant results unless the solvent employed is of continuously uniform constitution, i.e., we suppose, we must use either distilled water always, or else use tap water, drawn at one time, for the whole series of tests. (This seems only reasonable.) Blitz, and Dahr and Chakravarti have examined the question from the standpoint of the possible colloidal condition, viscosity, and electrical conductivity.

This present section of the paper takes up the author's studies from three viewpoints: influence of the nature of the water used for solution upon solutions freshly prepared at 25° C., the "ripening" of different solutions at 25° C. under the influence of storage for various periods, and influence of the presence of electrolytes upon the ripening of such aqueous solutions. His conclusions so far upon these points are, that the nature of the solvent water (he used distilled, Permutite, and river water) has a very varying effect upon the immediate state of equilibrium between the simple molecules and the complex micelles of the dyestuff; that the solutions of the dyestuffs studied reach the same state of equilibrium after a considerable time, and that this stabilization of condition is reached rapidly with distilled or Permutite water, and much more slowly with a water containing minerals in solution (Rhône water).

The interesting paper is to be continued further.

Vat Dyestuffs (Anthraquinone Series)

German Patent No. 462,799 (16/VII/'28)—*I. G. Farben-Ind. A.-G.*—The products here described are thiomorpholines of the anthraquinone series, produced by treating a-amino-anthraquinone-thiohydrines with acid condensing agents. These thiohydrines are produced by reacting a-amino-anthraquinones mercaptans with halogen hydrines. In the present reaction, by loss of water they pass over to the products mentioned, which are, without further working up, vat dyestuffs, but are of especial value as intermediates for further elaboration. The one example given covers a red vat dyestuff very suitable for acetate silk.

PROCEEDINGS OF THE
American Association of Textile Chemists and Colorists

November 5, 1934

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SEPTEMBER MEETING, NEW YORK SECTION

THE September meeting of the New York Section was held in Paterson, N. J. at the Elm Golf Club on Friday evening, September 28, 1934, Chairman Freedman presiding.

Chairman Freedman: Gentlemen, the meeting will come to order. The first order of business will be the reading of the minutes of the last meeting, which was, in truth, the June outing.

. . . Reports were heard from the Secretary, Treasurer and the Chairman of the Program Committee . . .

Chairman Freedman: We are very fortunate in having with us this evening a man who, while being very much in love with his work and with the subject of chemistry, also dearly loves to hang on to life.

For some time he was engaged in problems dealing with bursting of rock. I refer to explosives. He is now engaged in studying the bursting of soap bubbles. I have reference to Mr. J. C. Harris, the speaker of the evening, research chemist of the Colgate-Palmolive-Peet Company. Mr. Harris is in charge of soap, (technical application) and his work is, I believe, in great measure not only that of the research chemist, but also of the trouble finder.

He has problems presented to him from the manufacturing angle, that is, the soap manufacturing angle, and then from the consumer's angle—be that consumer the ultimate consumer, the public, or those engaged in the textile industry. He tells me that he frequently sees materials that have gone through washing processes, and he should as a result of his experiences be able to tell us quite a good deal about those things in which we are most interested.

The topic he has chosen for the evening is entitled: "Soap—From Manufacturer to Consumer", and I am certain that he will carry a very interesting message to us.

It gives me great pleasure to introduce to you Mr. J. C. Harris. (Applause).

. . . Mr. Harris then presented his paper on the subject of: "Soap—From Manufacturer to Consumer" . . . (Applause).

Proceedings of the American Association of Textile Chemists and Colorists

Soap: Manufacturer to Consumer*

By JAY C. HARRIS
Colgate-Palmolive-Peet Co.

THE object of this paper is to discuss very briefly some of the factors involved in soap manufacture and use.

Soap has been defined as the sodium or potassium salt of fatty acids derived from natural fats or oils. Such a definition may be enlarged to include fatty acids of synthetic nature as well as metallic salts of fatty acids

From the user's standpoint soaps may be divided into three general classes: Potassium or soft soaps, Sodium or hard soaps, and Metallic soaps. This is a convenient though not strictly scientific classification inasmuch as it includes soaps commercially prepared, or soaps produced incidental to manufacturing use. The soap maker may control the type of soap he desires to produce by controlling the fats and oils used. The more careful the control of stock purchased and the larger the quantity obtained, the greater the possibility of uniformity of soap from kettle to kettle.

As the definition of soap indicates, the properties of a soap depend upon the fats or oils used. A soap prepared from an olive oil of the following composition would be dependent upon the properties of the acids present:

Acids	*Percent*
Oleic Acid	83.1
Linoleic Acid	3.9
Myristic Acid	tr
Palmitic Acid	9.2
Stearic Acid	2.0
Arachidic Acid	0.2

A soap prepared from palm oil would be expected to have entirely different characteristics when its acid composition is considered:

Acids	*Percent*
Oleic Acid	43.2
Linoleic Acid	9.5
Myristic Acid	0.6
Palmitic Acid	44.0
Stearic Acid	2.9
Lignoceric Acid	0.1

(Jamieson—"Vegetable Fats and Oils")

It should further be realized that the compositions given are examples and not averages and thus that there may be considerable variation from the figures given. Consideration of these oil compositions shows that a soap made from fats or oils is a mixture of fatty acid salts rather than a salt of a single fatty acid. It is, however, possible to duplicate soaps of given characteristics since mixtures of fatty acid salts exert modifying effects on each other.

Purity—Chemical and Technical

In considering the chemicals commonly used in the laboratory, it is more or less common to assume them as being single compounds, particularly when a chemically pure product is under consideration. Such, however, is not the case, as chemical manufacturers admit, when their labels list the impurities and amounts present. Such chemicals, however, are chemically pure, because they represent the best product commercially obtainable, and because impurities present are there as traces only.

It is possible to manufacture chemically pure soaps. To do so involves considerable effort in separating the particular fatty acid desired. Separation of the fatty acids is difficult because so many of them exhibit practically the same chemical and physical reactions and properties with slight modifications. Even when a fatty acid has been separated in desired purity care is necessary in neutralization that a minimum of other impurity be added. Finally, when a chemically pure product has been obtained it will exhibit practically the same reactions as a technically pure soap, but will cost materially more. Cost therefore would undoubtedly remove it from consideration for technical use.

Properly manufactured and controlled soaps may be considered as technically pure when they contain a minimum of impurity and when they meet certain specifications as to composition.

Inherent to commercial soap manufacture are the following impurities, present as a result of such manufacture.

1—Unsaponifiable matter is present in fats and oils and may be considered as higher molecular weight hydrocarbons, but are mostly high molecular weight alcohols such

* Presented at meeting, N. Y. Section, Sept. 28th.

as sterols. They are obtained along with the fat or oil during the extraction process.

2—Free fat or fatty acid may be present in soap but if present the soap may tend to become rancid rather readily. They may have been present in the finished soap as a result of incomplete saponification, or may have been formed as a result of decomposition of the soap.

3—Free caustic alkali is generally present since it is considered best to finish on the alkaline side to prevent free fat or fatty acid being left in the soap.

4—Salt (sodium chloride) is used in graining out most soaps, and it is found practically impossible to eliminate entirely. In general it may be expected that a soap containing a small amount of free caustic alkali will contain a slightly larger proportion of salt than one with a higher free alkali content.

5—Glycerine is produced in the manufacture of soap and is present in finished soap since it is commercially unfeasible to remove all of it by washing. Its presence has practically no effect upon the properties of aqueous solutions of soap.

6—Practically all soaps will contain fractional amounts of sodium carbonate which entered as an impurity in the caustic soda used, or later by carbonation of free caustic alkali present.

Manufacturing Control

The first necessity in manufacturing control is a uniform supply of fats or oils. This may be accomplished by judicious blending of stocks, by purchase from a uniform source of supply in large quantities and by careful chemical examination so that rigid specifications shall be met and proper blends prepared.

The literature contains much information regarding the apparatus used in soap-making. A uniform finished product depends to a great extent upon the experience of the kettle-house foreman. If his experience permits, the size of the equipment and thus of the batch prepared depends upon whether or not a large batch is economically feasible. For example, certain of our more widely used soaps are prepared in kettles which will hold 400,000 pounds of finished kettle soap.

The experience of the kettle-house foreman is further supplemented by multiple checks made by the chemical control laboratory. Each kettle must meet certain rigid specifications before it may be pumped from the kettle for further processing. Chemical control of the kettle soap is followed by checks upon each batch of finished product. This careful examination of the product is necessary so that the purchaser may be assured of a uniform product today, or next year when he again needs a soap for a specific process.

The "impurities" present in technically pure soaps were previously listed. The care taken in chemical examination of raw stock, of the material in process, and finally of the finished product ensure a minimum content of such "impurities".

The soap manufacturer is further faced with the necessity of preventing his finished product, which to a certain extent is perishable, from changing chemically and introducing disagreeable effects into the user's manufacturing process or products. The chemical change referred to is the tendency of soap to become rancid. Without going into the details of this phase of soap work it may be of interest to consider general methods of preventing this disagreeable change. The soap manufacturer may prevent such change almost wholly, or to a certain extent, by turning out a soap containing no free fat or fatty acid, by recommending certain stringent storage conditions, by desiccation of the product, by the addition of small amounts of alkaline salts, by chemical change of the fatty acids involved, by the addition of chemicals known to prevent rancidity formation, or by combinations of these means. Certain fatty acids are known to become rancid readily and these are more generally present in fats or oils containing the larger percentages of unsaturated acids as does oleic acid.

In the foregoing discussion some of the general principles and difficulties which the soap manufacturer meets have been presented. It will now be worth while for us to consider some of the properties of soap and their application to manufacturing needs.

Soap Properties and Functions

The properties of soap are manifold and inter-related. The following list is not complete but will give an idea of the versatility of soap.

1—*Lather.* This is listed first because it is probably the most readily recognized property of soap. It is dependent upon a number of factors.

2—*Low Surface Tension.* The low surface tension of soap against air is reflected in lathering action.

3—*Low Interfacial Tension.* The fact that soap solutions exhibit relatively low interfacial tensions toward oil, etc., accounts in part for their emulsifying action.

Both low surface and interfacial tensions indicate that soap would exhibit considerable wetting action. Soap is in fact one of the most widely known and oldest of wetting agents though it is not always recognized as such.

4—*Deflocculative Action.* Soaps in aqueous solution will tend to retain particles of carbon black and certain other materials in suspension once they have been dispersed in solution.

This characteristic is exhibited as a phase of the detersive action of soaps. Detersive action depends in part upon a number of factors other than those already named, among which are colloidal properties, emulsifying action, so-called protective colloid action, wetting action and electric charge of such solutions.

5—*Alkaline Condition.* Aqueous solutions of soap are

alkaline, the hydrogen-ion concentration or pH of solutions being important in detersive action, silk degumming, wool scouring and other commercial operations. Investigators believe that the electrical charge of soap solutions bring about what may be called neutralization of the charge of fabrics and of soil particles thereon, reducing their original attraction and permitting the soil particles to be deflocculated and rinsed away.

6—*Colloidal Nature.* The fact that soaps jel rather than crystallize is taken advantage of by certain branches of industry.

Regardless of whether a soap is used as a detergent, emulsifier, wetter or disperser (i.e., deflocculator) the above properties are brought into play in greater or lesser proportion dependent upon the conditions of use. Furthermore it is of interest to consider the fact that soaps whether chemically or technically pure display these properties in use to practically the same extent.

Testing Material for Use

In order to test a substance for a specific use its action upon the material being processed should be investigated thoroughly and its suitability by means of tests should be determined. If possible it should be tested for purity or extent of sophistication.

Tests based upon the properties of soap have been devised. The literature is replete with reports of tests whose objects were to ascertain the range of such properties. It is generally conceded however that practical tests dictate whether or not a material may be used. There is a definite place for tests which conclusively measure properties since they may be extremely valuable adjuncts to chemical analyses in plant control or purchase. Such tests plus actual plant trial with careful control and knowledge of all variables and factors involved should do much toward establishing the desirability of a product under consideration.

The soap manufacturer is faced with production problems and must have a thorough knowledge of soap properties as well as applications. Because of intimate knowledge of soap products the manufacturer will be in excellent position to aid the prospective soap user. It should be possible for him to suggest the proper soap and conditions for a particular use and to reduce the amount of experimentation materially. The soap manufacturer generally maintains a staff capable of aiding prospective users. This staff will have studied soap properties, their possible applications and the mechanism and control of their action in use.

A soap user, therefore, may expect to obtain a product uniform in quality and composition, and which is reasonably stable upon storage. He should expect the soap manufacturer to be aware of problems involved, but himself should be capable of recognizing and controlling the variable factors in his own plant operation.

Discussion

Chairman Freedman: Are there any questions that any of you care to ask of the speaker?

Mr. Schmidt: There are products advertised extensively as being a certain per cent pure. What is the impurity?

Mr. Harris: Perhaps a few words along that line would be well.

There are built soaps, and soaps which are called technically pure, or pure soaps. The pure soap will probably run 88 to 92 per cent pure, dependent upon the amount of moisture present. For instance, if you have a 4 per cent moisture soap, you may have 88 per cent anhydrous soap, plus free caustic alkali, if any. Perhaps there may be a little builder, added not as a builder, but more as a protection from rancidity. There will be salt and glycerine among those materials that I mentioned before, and they will make up the balance of your percentage from 100.

Dr. Harold: I would like to ask Mr. Harris if there has been any success in the use of maleic anhydride to prevent rancidity in practical soap manufacture.

Mr. Harris: I don't remember that it has been applied to soap use. It may have been.

Mr. Schmeidler: What is the difference between green oil soaps and red oil soaps in textiles, olive oil foot soap and nearly pure oleic acid soap?

Mr. Harris: An olive oil soap will conform more or less closely to that analysis that I gave you there, according to the acid present. The oleic acid soap, or the red oil soap, will be perhaps 90 to 95 per cent oleic acid, with the balance of stearic acid and traces of these other acids. It is practically impossible to segregate the single acid.

Mr. Schmeidler: Is there any reason, aside from tradition, as I remember it, that you gave 83 per cent oleic acid as being in olive oil? Olive oil foots probably is less than that in oleic acid.

Mr. Harris: As I recall it, it will run around 80 per cent.

Mr. Schmeidler: That is only 10 per cent different from your description of the red oil. In textile processes, is there any reason why the substitution of that 10 per cent of assorted fatty acids should change its properties in the dye house?

Mr. Harris: Practically, we have never been able to see any.

Mr. Schmeidler: In other words, as far as you can tell, a red oil soap would be just about as good as what they call Marseilles soap.

Mr. Harris: On the other hand, I would say that the olive oil soap is just as good as the Marseilles soap, the green olive soap.

Mr. Schmidt: If you added 10 per cent of Syntex to

good Colgate soap, would that reduce its pH in solution?

Mr. Harris: It perhaps would, inasmuch as Syntex is in solutions practically neutral (6.8). We recommend that it be used in combination with soap. It may be, but we do not find that it pays us to put that in soap to sell to the textile user simply because he is more capable of adding that in the proper proportions according to his water conditions and processing conditions than we are.

Mr. Schmidt: Would it reduce the pH?

Mr. Harris: It would very slightly, perhaps two-tenths of a unit.

Mr. Schmeidler: We are finding materials like cotton seed oil and other vegetable oils, besides the older ones, coming into the soap business. Is there any reason to fear them?

Mr. Harris: That we should fear them?

Mr. *Schmeidler*: That we should fear them. I meant as either frank adulteration or subtle adulteration.

Mr. Harris: It all depends on what you wish to use the soap for.

Mr. Schmeidler: Dye house purposes.

Mr. Harris: Oftentimes, for dye house purposes, you may use a tallow soap. It all depends on the soap properties which you obtain in the blending with cotton seed oil.

Mr. Schmeidler: If a competitor of yours were to offer a soap which is a cotton seed oil soap, as far as you can tell from appearance, substantially similar to an olive oil soap, would there be any reason to hesitate in using that, or should any special precautions be taken? Would it require softer water, hotter water, extra washing, or anything of that kind?

Mr. Harris: As a matter of fact, your cotton seed soap would never approximate the fatty acid properties of an olive oil soap. It never could. Simply because cotton seed oil has different fatty acid characteristics entirely. There are different compositions of the fatty acids present than there are in an olive oil soap, and, therefore, you couldn't expect to obtain the same properties of that soap in solution as you could from the olive oil soap.

Mr. Schmeidler: When you speak of properties in solution, do you mean pH, for example?

Mr. Harris: I am speaking of properties in solution as the pH, but more particularly of the fatty acid characteristics, the Titer, the acid value.

Mr. Schmeidler: I am willing to admit that if you present to our laboratory a cotton seed oil soap and an olive oil soap, they will be able to tell which is which. But why shouldn't we just as well use one as the other in the boil-off bath?

Mr. Harris: Simply because you cannot generalize and get anywhere. The cotton seed soaps are higher Titer soaps, say, 32 to 36. If they are higher Titer, it indicates that they are more acids of the stearic type, and of the saturated type present. It is well known that these saturated acids have a greater tendency to hydrolysis, and form free caustic alkali and free fatty acid, than do the lower Titer soaps.

On the other hand, an advantage of a low Titer soap, over a high Titer soap, is that you may rinse it from the goods more thoroughly and more easily, and at lower temperatures than you can the higher Titer soap.

Mr. Schmeidler: For example, a laboratory test, a point at which turbidity occurred would be a protection for a dye house against that?

Mr. Harris: It would not, simply because turbidity may be induced by the amount of hardness in the water present.

Mr. Schmeidler: I meant a comparative test.

Mr. Harris: That might be a nice test for use in combination with your actual technical experience with the test. That technical trial, with careful control, is the only way that I know of proving or disapproving that soap is usable for the purpose.

Mr. Siebert: What action would both of those soaps have, if a cotton seed oil soap is used, what action would that have on the silk in comparison to an olive oil soap?

Mr. Harris: We would expect that silk would probably in the boil-off show a greater amount of soap retained after rinsing, simply because it isn't rinsed away as readily. We would expect that, because of the greater hydrolysis of the soaps, that is the higher Titer soaps, that we would have a dullness, or chafing, apparent on the silk. That has been proven.

Mr. Schmeidler: That would be evidenced in the higher pH. You wouldn't be able to protect yourself against that by buffers of any sort?

Mr. Harris: I haven't found any buffers, and I don't believe any have been mentioned that are sufficiently strong to take care of that.

Mr. Von Bergen: How are these new fatty oil soaps affecting your products?

Mr. Harris: Our products, we find, have their place in industry, and that place is in hard water usage, in the usage where soap cannot be used. For instance, in an acid bath. They do have dispersive action there, and we find that they are continuing to use soap because it has a price of 5 to 8 cents a pound as against 40 to 60 cents, more or less, for these other products.

Mr. Von Bergen: Have you made comparative tests where you can say that Syntex can take the place of other soaps?

Mr. Harris: We have been able to suggest that they use Syntex replacing dollar value. For instance, if you had 8 pounds of soap in a particular bath, we could replace two pounds of that soap with Syntex, using the dollar equivalent of Syntex with the soap which has been replaced. Syntex is extremely active in dispersing insoluble soaps which have been formed.

Mr. Von Bergen: In which industry have you had that experience?

Mr. Harris: That is used particularly in removing the water-proofing, the alum soap strip from water-proof goods.

Mr. Von Bergen: My experience in the wool industry is that these new products are at a disadvantage for washing new wool. Instead of letting the impurities of the wool settle out in the scouring pan, they keep them in suspension, and, therefore, the washing is far less effective than with the regular soap.

Mr. Harris: I have never heard that explanation of it before. That speaks highly for the action of Syntex.

Mr. Von Bergen: The test is over a quarter million pounds of wool.

Mr. Harris: I understood that these products acted somewhat as substantive dyes, simply because they are slightly acid in nature and because wool has its amphoteric character. They might act as substantives there and be taken out of solution and carried through the bath that way, thus exhausting the bath faster than you would with soap.

Mr. Von Bergen: That is all theory. I made tests in the beginning too, but on the basis of real tests, it doesn't work out.

Mr. Harris: Suppose these materials, instead of being 45 to 65 cents a pound, were around 20 cents a pound, four times the cost of soap. Would they be of any advantage to you then?

Mr. Von Bergen: No. I made tests on the basis that I used, the regular amount of soap was 2 kilos soap per hour, and we sell 200 kilos clean basis of wool, and I used 3 kilos of one of these products and was not able to get the clean wool. And I used 3 and a half kilos and was able to get it. (Laughter)

Mr. Sokolinski: Regarding the cotton seed oil soap, there was some very interesting testimony at the time they were trying to put on this tax. Probably you have read that testimony. It is very interesting. They explain about the cotton seed oil soap, how difficult it is to rinse out, regardless of how often it is rinsed; and in turn, there is a great tendency toward rancidity even in the fabric. It is very interesting, the whole testimony.

Mr. Schmeidler: Does that hold even if you use material such as sodium phosphates in the wash?

Mr. Sokolinski: They had examples in the mill work and laundry work, where the ones that are interested in domestic oils would try to push that to the soap kettle, the cotton seed oil as compared to the cocoanut and palm oil; but they have been successful in view of the fact they got the tax through. But, still, the oil isn't used for that purpose. They are still fighting it.

Chairman Freedman: Are there any other questions?

Mr. Carter: I would like to ask about the use of soap in emulsions. I have had some work to do using soap for dispersing paraffin. What kind of soap would you consider the most effective for that?

Mr. Harris: What kind of emulsion were you thinking of—a semi-solid, as the cold cream type, or rather a liquid one?

Mr. Carter: For finishing. They might have a couple per cent of paraffin.

Mr. Harris: Soap hasn't been particularly successful for that particular use. It is necessary to use a large percentage of soap to get a perfectly stable, clear solution, or rather, dispersion of the materials. And the soap that would probably be most advantageous for use there would be an olive oil type of soap, simply because it will remain liquid up to 20 per cent concentration, and thus will be possible to disperse the particles of the petroleum oil.

On the other hand, I believe that soap will get a better break if you were to use homogenizers rather than the mechanical stirring.

Mr. Carter: What ratio would you have to use there, 2 to 1, 3 to 1, or 4 to 1?

Mr. Harris: I couldn't answer that off-hand.

Mr. Carter: Is it very large, in the ratio of 10 to 1?

Mr. Harris: It is more along the 10 to 1 ratio.

Mr. Tekniff: Do you believe that the addition of Syntex to a soft water dye bath containing soap would be of any advantage? That is, soft water dye bath that has been softened by a zeolyte softener?

Mr. Harris: I believe it would. It would offer a possibility along the line of getting a more uniform piece of goods, and offering you possibilities in rinsing. We have found that it is possible to rinse a piece of goods much cleaner using Syntex in combination with soap than soap alone.

Mr. Tekniff: Have you ever found it advantageous to use Syntex alone without soap?

Mr. Harris: We have recommended it for that purpose sometimes in combination with mild alkalis. If you desire the pH on the acid side, you can use Syntex with acids, provided, of course, they are not too concentrated and the temperatures are not too high.

Mr. Tekniff: As I understand it, Syntex has a tendency to prevent calcium soap formation.

Mr. Harris: It does have a tendency to prevent that formation to a certain extent. However, the mechanism is really more along the line of dispersing the soap which may be formed, or already has been formed, preventing it from sticking to the goods.

Mr. Tekniff: You more or less try to keep the calcium soaps in solution rather than forming a scum. What sort of explanation do you have to offer for that reaction?

Mr. Harris: The Syntex products are sulfonates. They

(Continued on page (285) 621)

Proceedings of the American Association of Textile Chemists and Colorists

Report of

Series 8 Light Exposures

A Comparison of the Fading Produced by Four Fading Lamps and the Sun on Forty Selected Dyeings

IN the accompanying tables will be found a record of the percentage of fading (compared with sun fading taken as 100%, which resulted when forty dyeings, some of them wool, some cotton, some silk, dyed with a selected list of coloring materials (see Table 1) of various classes and including a number which according to previous trials had been shown to fade abnormally in the light of a carbon arc, were exposed to the following fading lamps:

1. (Set 129-130). Old Fadeometer[1], Type C, at the National Bureau of Standards, Washington, D. C. Exposure ratio 0.78. Relative humidity probably 10% or less. Temperature about 60° C. Current 140 volts, 13-16 amperes D. C. Two No. 70 solid electrodes. Samples ten inches from arc. Corex D glass globe surrounding arc.

2. (Set 125-126). New Fadeometer[1], Type FDA, at the National Bureau of Standards. Exposure ratio 0.78. Relative humidity 33%-85%. Temperature 25°-32° C. Current 140 volts, 11.5-12.5 amperes D. C. Three No. 70 solid electrodes (1 upper, 2 lower). Samples ten inches from arc. Corex D glass globe surrounding arc.

3. (Set 121-122). Fugitometer[2], at the National Research Council, Ottawa, Canada. Exposure ratio 3.33. Relative humidity 47%-49%. Temperature 33.0°-34.4° C. Current 130 volts, 15 amperes A. C. One No. 70 solid electrode, one No. 20 cored electrode. Samples 11 inches from arc. One pane of Vita glass between samples and arc. Vita or Corex glass globe surrounding arc.

4. (Set 119-120). Modified Fugitometer[3], Ontario Research Foundation, Toronto, Ontario, Canada. Exposure ratio 2.08. Relative humidity 53%. Temperature 25° C. Current 220 volts, 14 amperes D. C. Two No. 70 solid electrodes. Samples 12 inches from arc. One pane of Vita glass between samples and arc. Glass Globe[4] surrounding arc.

The "exposure ratio" is the number of hours of exposure to the lamp, divided by the number of hours of exposure to the sun.

The sun exposures (Set 127-128) were made on the roof of the Industrial Building, National Bureau of Standards, Washington, D. C., in a cabinet facing due south, at an angle of 45 degrees from the horizontal, between 9 a. m. and 3 p. m. on sunny days only, during the summer and fall months. The cabinet was covered with window glass and was open at the sides to allow free access of air to the samples. The samples were placed one-half inch away from the glass. This is the standard sun test of the Association[5].

Every sample was exposed for four different periods of time, representing 1, 2, 4 and 8 "units" of light exposure, the "unit" varying according to the fastness of the dye being exposed, in order to produce a sufficient amount of fading on every dyeing (see Table 2, Column 2). Thus, in the sun test, for 10 dyeings the "unit" was 3 hours; for 5 dyeings, 6 hours; for 13 dyeings, 12 hours; and for 12 dyeings, 24 hours. The same system was employed in making the lamp exposures, but the "units" of light exposure employed in the sun test were increased or decreased for each lamp (as already indicated by the "exposure ratio") so as to compensate for any difference in the average rate of fading produced by the lamp compared with the sun, and make the average fading of all the samples in each lamp approximately equal to the average fading in the sun test.

If the results of these exposures (see Table 2) are critically examined it will be observed that the new Fadeometer, Type FDA, is an improvement on the older Fadeometer, Type C, inasmuch as 21 of the 40 samples faded in the new Fadeometer to practically the same extent as in the sun test, compared with only ten samples in the old Fadeometer (a slightly lower "unit" of light would have helped the latter, however, as the samples in this lamp were a bit over-exposed, on the average). It is also apparent that the modified Fugitometer of the Ontario Research Foundation is a little more like the sun than the Ottawa Fugitometer, with 21 out of 40 samples in the Ontario lamp fading in the same manner as

[1]Made by Atlas Electric Devices Co., Chicago.
[2]Made in England. Developed by the British Wool Industries Research Association.
[3]R. O. Hall, Am. Dyestuff Reptr. *22*, 437-441, 444 (1933).
[4]No. 923 Thermo Clear globe of the Atlas Electric Devices Co.
[5]Cady and Appel, Am. Dyestuff Reptr. *18*, 407-446 (1929).

TABLE 1

Dyeings Used in Series 8 Light Exposures

Serial	*Per Cent*	*Dye*	*Maker*	*Method*	*C.I.*	*Fiber*
1	1	Acid Anthracene Red 3BM	Garfield	Acid	487	Wool
2	1	Indigotine CC	Geigy	Acid	1180	Wool
3	1	Erio Viridine B Conc.	Geigy	Acid	667	Wool
4	1	Victoria Violet 4BS	Campbell	Acid	53	Wool
5	1	Quinoline Yellow O	General	Acid	801	Wool
6	2	Azo Acid Blue B	Sandoz	Acid	59	Wool
7	1	Chrome Blue GCB	National	Chr. Mord.	883	Wool
8	1	Purpurine 4B Conc.	DuPont	Salt	448	Cotton
9	2	Niagara Blue 2B	National	Salt	406	Cotton
10	2	Pontamine Yellow SX	DuPont	Salt	620	Cotton
11	4	Primuline NAC. B-Naphthol	National	Developed	812	Cotton
12	1	Methylene Blue ZF	Calco	Tannin	922	Cotton
13	1	Methylene Green	Calco	Tannin	924	Cotton
14	5	Direct Black EG 200%	Newport	Acetic	581	Silk
15	2	Direct Sky Blue 6B Conc.	Newport	Acetic	518	Silk
16	2	Safranine Y Extra	Calco	Acetic	841	Silk
17	1	Victoria Blue BX	DuPont	Acetic	729	Silk
18	2	Wool Green S	General	Sulfuric	739	Silk
19	2	Eosine Y	General	Acetic	768	Silk
20	2	Scarlet 2RY	Sandoz	Sulfuric	79	Silk
21	1	Alizarine Blue SAP New	General	Acid	1054	Wool
22	2	Erio Violet RL	Geigy	Acid	—	Wool
23	0.2	Metanil Yellow 1955	National	Acid	138	Wool
24	0.5	Erio Chrome Cyanine RC	Geigy	Top-Chrome	—	Wool
25	1	Scarlet 2RY	Sandoz	Acid	79	Wool
26	0.5	Alizarine Brown B	Calco	Chr. Mord.	101	Wool
27		Naphthol ASG, 12 gpl	General			
		Fast Scarlet 2G Salt, 24 gpl	General	Insol. Azo	—	Cotton
28		Indigo, Navy Shade	DuPont	Vat	1177	Cotton
29	1	Chlorantine Fast Green BL	Ciba	Salt	—	Cotton
30	2	Pontamine Fast Orange S	DuPont	Salt	326	Cotton
31	0.5	Solantine Brown R	National	Salt	—	Cotton
32	0.3	Chrysophenine XXX Conc.	Newport	Salt	365	Cotton
33	2	Direct Sky Blue 6B Conc.	Newport	Salt	518	Cotton
34	2	Diazo Indigo Blue 4GL Extra, B-Naphthol	General	Developed	—	Cotton
35	2	Pontamine Violet N	DuPont	Acetic	394	Silk
36	2	Alizarine Astrol B	General	Acetic	1075	Silk
37	2	Azo Rubine Extra	National	Sulfuric	179	Silk
38	2	Hematine Crystals	Campbell	Iron Mord.	1246	Silk
39	0.5	Helindone Orange R	General	Vat	1217	Silk
40		Naphthol AS, 6 gpl	General			
		Naphthanil Blue B Base, 1.5 gpl	DuPont	Insol. Azo	—	Silk

in the sun test, compared with 19 samples in the Ottawa lamp. Comparing the new Fadeometer with the Ontario lamp we find a remarkable similarity, with 21 samples each duplicating the sun fading; identical results for all practical purposes.

These observations are also supported by a consideration of the spread of the results, that is, the number of samples which have faded distinctly more or distinctly less than the average in the lamps. For example, the number of samples that have faded at least 50 percent too much or too little in the lamps is: Old Fadeometer 25, New Fadeometer 13, Fugitometer 18, Modified Fugitometer 12.

The relative time in the four lamps and the sun test for the same exposure period can be seen from the length of the "units" of light employed: sun, 3 hours; old and new Fadeometers, 2 1/3 hours; Ottawa Fugitometer, 10 hours; Ontario lamp, 6¼ hours. The new Fadeometer would thus appear to be slightly slower than the old Fadeometer, but about 2.7 times as rapid as the Ontario lamp, which in turn is 1.6 times as rapid as the Ottawa Fugitometer.

A list of the dyes used in preparing the 40 samples for these exposures is appended (see Table 1); also a table showing the percentage of fading produced in each of the four fading lamps on every one of the forty dyed samples, compared with sun fading taken as 100% (see Table 2).

The Committee wishes to express its appreciation of the active cooperation which it has received from Dr. R. O. Hall of the Ontario Research Foundation, Dr. P. Larose of the National Research Council of Ottawa, Canada, and Mr. William C. Smith, Research Associate of the A.A.T.C.C., in carrying out these comparative tests, and from the Atlas Electric Devices Co., in furnishing the FDA Fadeometer which was used.

Sub-Committee on Light Fastness
WILLIAM H. CADY, *Chairman.*

TABLE 2

The Percentage of Fading Produced in Four Fading Lamps, Compared With Sun Fading Taken as 100%

Serial Number of Dyed Sample	Unit of Exposure, Standard Sun Test (hours)	Old Fade-ometer Exposure Ratio 0.78	FDA Fade-ometer Exposure Ratio 0.78	Ottawa Fugit-ometer Exposure Ratio 3.33	Ontario R. F. Lamp Exposure Ratio 2.08
1	6	100	100	100	100
2	3	150	150	200	100
3	3	200	150	100	100
4	12	100	50	75	75
5	12	100	75	150	100
6	12	100	50	75	75
7	12	200	100	100	100
8	3	75	100	150	100
9	3	75	100	150	100
10	6	300	150	100	75
11	3	100	100	200	150
12	12	100	100	150	100
13	12	150	100	150	100
14	12	150	100	100	100
15	3	75	75	50	75
16	3	50	50	75	50
17	3	150	100	100	100
18	12	100	75	100	75
19	3	50	33	50	33
20	12	100	75	100	75
21	24	200	100	100	100
22	24	200	150	100	100
23	24	200	150	100	150
24	24	200	100	150	200
25	12	150	100	100	100
26	12	200	100	150	100
27	24	300	200	200	300
28	24	100	100	200	200
29	24	200	150	100	150
30	6	150	100	200	200
31	12	200	150	200	150
32	24	100	100	100	100
33	6	75	75	100	100
34	24	150	100	200	150
35	24	200	100	50	100
36	24	150	100	100	100
37	24	150	100	100	100
38	6	200	100	100	100
39	12	150	75	100	75
40	3	75	50	50	50
Summary: 33%		0	1	0	1
50%		2	4	4	2
75%		5	6	3	7
100%		10	21	19	21
150%		10	7	7	5
200%		11	1	7	3
300%		2	0	0	1

Soap: Manufacturer to Consumer

(Continued from page (282) 618)

have no carboxyl group. They probably may form complex metallic salt soap combinations, and, in addition, there is a possibility, that they are liable to permit of greater rinsing from the goods. And, on top of that, they have wetting action, and thus prevent the particles from deflocculating from solution and adhering to the goods.

Mr. Tekniff: What sort of effect does it have on sizing, such as might be on rayon in a bath?

Mr. Harris: You are thinking of scouring the piece goods?

Mr. Tekniff: Supposing there were some sizings of some sort left in your piece, and they got into the dye bath. Do you think that Syntex would have a tendency to prevent scum formation in a case like that where there may be gelatin?

Mr. Harris: It does have very high emulsifying action with or without soap present, or even without the presence of alkali.

Chairman Freedman: Any further questions?

Mr. Harris, we all enjoyed your excellent paper on soap this evening. I guess you are fully convinced of the considerable amount of interest in the subject by the animated questions and cross-fire this evening.

I want to thank you on behalf of the New York Section for speaking, and we hope to have the pleasure of your company at a future meeting.

Is there any further business to come before the Section?

There being no further business, the meeting is adjourned.

. . . The meeting adjourned at 9:15 o'clock P. M. . . .

CALENDAR OF COMING EVENTS

Annual Meeting, Piedmont Section, Charlotte, N. C., November 10th.

• • •

Annual Meeting and Convention, National Association, Hotel New Yorker, New York City, December 7th and 8th.

Proceedings of the American Association of Textile Chemists and Colorists

UNEMPLOYMENT REGISTER

Members of this association, who are without employment, should forward to the secretary a statement as to their qualifications and experience. This information will subsequently appear on these pages with an identifying key number. Employers are also requested to file with the secretary any vacancies which may occur in their businesses.—H. C. Chapin, Secretary, Lowell Textile Institute, Lowell, Mass.

Key: A—Laboratory and research; B—Dyeing or printing; C—Finishing; D—Sales; E—Instruction; F—Executive

Note. Persons who have obtained employment should notify the secretary at once. Prospective employers may file vacancies either with the secretary or the American Dyestuff Reporter.

A-2

Education—B.T.C., Lowell Textile Institute, 1932; also course in typing.

Experience—None to date, interested in quantitative analysis, experimental dyeing, color matching, dye testing and dye identification. Ability to learn quickly and will go anywhere. 23 years old, woman, single.

A-5

Education—B.T.C., Lowell Textile Institute.

Experience—Assistant chemist in carpet mill, dye tester in dye plant, research and analytical work in silk dyeing and finishing plant laboratory, plant chemist and overseer of bleaching in surgical dressing plant, assistant chemist in woolen mill. Age 29. Married.

A-B-2

Education—Lowell Evening Textile School, 1917.

Experience—Five years' experience in hosiery dyeing, full fashioned hosiery of silk and cotton and silk, also men's hosiery containing rayon, wool, cotton and celanese. Several years experience in laboratory work. Has also had experience in jig-dyeing of cotton piece goods, slub and top dyeing.

A-B-C-1

Education—Graduate Industrial Chemical Engineer, Pratt Institute—1911.

Experience—One year as plant control chemist, 4 years as laboratory chemist with gas company, 13 years as plant chemist with bleaching, dyeing and finishing plant. (Rayon and cotton piece goods). Formulated processes and put them into plant operation, 1 year as chemist and demonstrator for dyestuff company, 1 year as superintendent colorist with print works printing linen and rayon, 1 year as director of testing laboratory for national dry goods concern.

A-B-C-2

Education—Graduate of Lewis Institute of Engineering of Chicago and graduate of Philadelphia Textile School (Chemistry and Dyeing department).

Experience—Has had extensive experience as assistant chemist and colorist in silk printing, dyeing and finishing; also dyeing raw stock wool; and dyeing and finishing cotton and rayon. Age 30; married; references.

A-E-1

Education—Ph.D., Univ. of Illinois, studied chemical engineering at Columbia, licensed chemical engineer, New Jersey.

Experience—10 years' experience teaching in colleges, subjects included chemical and textile subjects. Has had broad experience in industrial work including experience in testing materials, research and consulting. Will go anywhere; references.

B-1

Education—Educated and trained in chemistry and calico printing in Glasgow, Scotland.

Experience—Has been with large print works as colorist for 13 years producing first class work on cotton, rayon, wool and silk fabrics. References.

B-2

Experience—Boss dyer with one firm for 18 years, divisional supt. at print works for 1 year, in charge of processing and dyeing of cottons and rayons at large bleachery for 6 years. Prefers bleachery in East but will go anywhere. References.

B-3

Experience—Foreman piece dyer for the past 21 years. Can dye the following; celanese, rayon, cotton lacks, wool, silk and mixed fabrics. Has knowledge of finishing and laboratory work.

B-6

Education—Graduate R. I. School of Design.

Experience—5 years in bleachery, 7½ years as assistant dyer, 2 years as boss dyer and 3 years as superintendent of dyeing and finishing. Married, 33 years old. References.

B-7

Experience—Eight years as boss dyer on skeins and ribbons. Over ten years as chemist and head dyer for a large hosiery mill. Experienced on Silk, cotton, rayon and wool in skeins, ribbons, piece goods and all kinds of mixtures. Willing to go anywhere. Not afraid to work or face responsibility. Can handle help efficiently.

B-8

Education—Chemistry and Dyeing Department, Philadelphia Textile School.

Experience—Eleven years experience as chemist and boss dyer on the following: woolen, worsted and cotton yarn; woolen, worsted and union piece dyes on both ladies' and men's wear; wool, cotton, shoddy and mohair raw stock. Age 33, married, will go anywhere. References.

B-9

Experience—Hosiery dyer with fifteen years' experience on high grade silk hosiery; familiar with all types of machines. Age 43, married. Will go anywhere.

B-12

Education—2 years days at N. Y. U. and 3 years nights studying chemical engineering.

Experience—1½ years asst. colorist, 5½ years colorist. Experienced on vats, commercial and fast colors on cotton and cotton-rayon mixtures. References; age 29; married.

B-13

Experience—Large experience as an assistant colorist chemist in silk printing, dyeing and finishing; also on cotton and wool dyeing. References.

B-14

Education—Rhode Island School of Design.

Experience—Familiar with all classes of wool dyeing. Seven years with large carpet mill as dyer and processor of washed oriental rugs. Will go anywhere, married, 37 years old. References.

B-15

Education—B.T.C., Lowell Textile Institute, 1934.

Experience—Experience in dye house running washers, dye kettles and as a dye weighter.

F-1

Education—Textile Institute, Alexander Hamilton Inst., Extension work at Brown Univ., working knowledge of German.

Experience—Has had executive departmental work with all types of textiles manufacturers. Acquainted with all types of textile machinery, dyestuff application, laboratory practice, cost methods, and checking methods and processes. References.

ANNUAL MEETING AND CONVENTION

A. A. T. C. C.

HOTEL NEW YORKER
New York City
December 7th and 8th

(*See Next Page*)

1933 YEAR BOOKS

The 1933 Year Books were mailed to members by the Howes Publishing Co. in September. If you have not received your copy, please notify the Secretary of the Association, Dr. H. C. Chapin, Lowell Textile Institute, Lowell, Mass. Additional copies may be obtained from the Secretary for $3.00 plus postage. Postage is 11c in the Boston zone and proportionate elsewhere.

HERE ARE THE COMMITTEE MEMBERS

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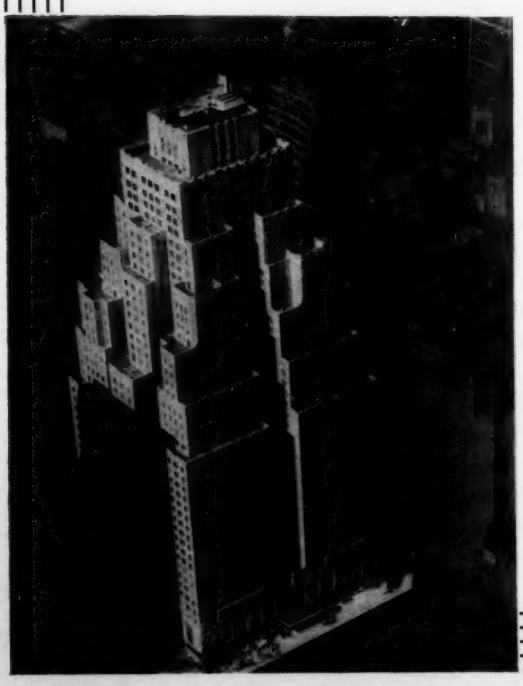
HOTEL NEW YORKER



TECHNICAL PROGRAM COMMITTEE

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ANNUAL MEETING AND CONVENTION

A. A. T. C. C.

NEW YORK CITY

December 7th and 8th

AMERICAN
DYESTUFF
REPORTER

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Professor of Chemistry and Dyeing, Lowell Textile Institute
Directing Editor

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Vol. XXIII November 5, 1934 No. 23

CURRENT AND FUTURE EVENTS

● Wages and Prices

PRESIDENT ROOSEVELT has announced in Washington that effective July 1st, 1935, the Federal pay cut of 5% would be restored. This affirmed his belief in future price rises. It is indicated, however, that this advance in prices will not be in evidence immediately or else the date of the restoration would have been further advanced. The significant feature in this announcement is the fact that the President was given power to raise salaries when it was shown by reports submitted by the Bureau of Labor Statistics of the Department of Labor that an increase in living expenses justified a resumption of the former salary scale. We must therefore conclude that the next eight months will witness a rise in prices carrying with it higher living costs. Without a subsequent rise in salaries for all to meet these increases we can expect difficulties. Many industries will not be able to take care of such expenses.

● NIRA Invalid

We learn that in Birmingham, Alabama, a judge of a Federal District Court declared invalid the National Industrial Recovery Act and dismissed code violation indictments against an Alabama lumber dealer. This action is expected to expedite action by the United States Supreme Court in making a ruling on the Act. This decision will be significant inasmuch as the NRA, in its present form, is scheduled to expire next June and a decision before that time will enable Congress to ascertain whether any changes should be made.

● Labor and the Government

It has become apparent that the truce in industry proposed by the President about a month ago is rapidly vanishing due to developments between labor and the government. Leaders of the various labor organizations, disgruntled by a series of events, have decided that the government does not intend to enforce absolutely the provisions of Section 7a of the Recovery Act. This would indicate that labor, rather than pay attention to the various labor boards, will tend toward economic disturbances resulting in strikes. Although it does not intend to completely abandon contact with the labor boards it appears that labor has lost its confidence in them, because of lack of prosecutions after decisions of the board. Another course which the unions may pursue is to seek for legislation outlawing the company union and giving more power to the agency handling labor disputes. We may probably expect much activity by labor groups in the coming months on these questions.

● Annual Meeting

On the page facing you will find the names of the committee members for the fourteenth annual meeting of the American Association of Textile Chemists and Colorists. You will note that they have all been prominent in the affairs of the Association and also in the field covered by the Association. This is your assurance of a profitable and pleasant week-end in New York City on December 7th and 8th. Besides the attractions of the meeting, New York City itself presents an unusual opportunity to see, hear and wonder. There are probably more permanent items of interest here than in any other city in the world and between the meeting and the city you will be able to plan for yourself a distinctive and unusual visit. P. J. Wood, who is a charter member of the Association and was national president from 1930 to to 1932, will act as toastmaster at the banquet on Saturday evening and is in charge of the program for that evening. Henry F. Herrmann, former chairman of the New York Section, is acting as chairman of the Arrangements Committee and Carl Z. Draves, Councilor-at-Large, is heading the Technical Program Committee. We'll see you at the New Yorker!

ANNUAL MEETING
AND CONVENTION
A. A. T. C. C.
Hotel New Yorker New York City
December 7th and 8th

● CORRECTION

In our issue of October 8th it was erroneously stated that the article "Rosins, Viscose, etc., in Finishing Cotton Cloths" was reprinted from the *Textile Manufacturer*. This was originally published in *Cotton* and was the ninth of a series of articles written by J. Andrew Clark, chief chemist of the Dutchess Bleachery, Inc., for that publication.

● COURSE IN TEXTILES

In response to efforts made by the South Central Section of the American Association of Textile Chemists and Colorists the University of Chattanooga has started a fifteen weeks' course in textile fibers held every Saturday morning. The lecturer is Mr. Sidney M. Edelstein, assistant chemist of the Dixie Mercerizing Co.

● PRESIDENT OF A.S.T.M.

Dr. Hermann von Schrenk, consulting timber engineer, St. Louis, Mo., and senior vice-president of the American Society for Testing Materials, was elected to the office of president on October 9. This action was taken by the executive committee to fill the vacancy caused by the death of W. H. Bassett who passed away on July 21 soon after he took office as head of the society.

The new president, member of the society since 1903, is a graduate of the following universities: Cornell, 1893, B.S.; Harvard, 1894, A.M.; Washington University, 1898, Ph.D. He was instructor in plant diseases at Washington University, St, Louis, 1896-1903; pathologist in charge Mississippi Valley Laboratory, U. S. Department of Agriculture, 1898-1907, and in charge of timber investigations, special agent and chief, Forest Products, Bureau of Forestry, U. S. Department of Agriculture, 1901-1905. He is consulting timber engineer for many railroad systems. Doctor von Schrenk is the author of several books dealings with timber problems and he has presented many technical papers on timber and its preservation.

● SCIENTIFIC RESEARCH

Realizing that reports of most of the considerable program of scientific textile research, now in progress in this country, shoot over the heads of the average technicians, the U. S. Institute for Textile Research, Inc., devoted the major part of its fifth annual meeting to the interpretation of scientific textile research results and trends. The meeting was held at the Hotel Pennsylvania, New York City, Thursday, Nov. 1, starting with luncheon at 12:30 P. M.

The chemical side of scientific textile research was interpreted by Dr. Robert E. Rose, director technical laboratory, Organic Chemicals Dept., E. I. du Pont de Nemours & Co., Wilmington, Del., and president of the American Association of Textile Chemists and Colorists. The physical side was handled by Edward R. Schwarz, F. T. I., assistant professor of textile technology, Massachusetts Institute of Technology, Cambridge, Mass. Dr. Rose and Prof. Schwarz are actively associated with U. S. Institute and are also members of the Advisory Committee of the Textile Foundation.

Dr. Karl T. Compton, president of Massachusetts Institute of Technology, and chairman of the Textile Foundation's Advisory Committee and of the National Science Advisory Board, was a guest of U. S. Institute and discussed informally the symposium subject. Hon. Francis P. Garvan, president of U. S. Institute and of the Chemical Foundation, presided.

The program committee was as follows: Dr. W. E. Emley, Chm., Dr. H. DeWitt Smith, Alban Eavenson, Prof. E. R. Schwarz, C. H. Clark.

● CONTROLLING DYE AFFINITY

A new process for treating mercerized yarns to control dye affinity is announced by The Ewing-Thomas Corporation, Chester, Pennsylvania. The process, described as mechanochemical, controls the basic structure of the yarn, and for the first time is said to make available to the knitting trades mercerized yarns with heightened or retarded affinity for dye.

The new yarn, for which patent has been applied is known as "Metro-Shade", which means "combining of shades", and it is claimed will be of major importance to manufacturers using Bemberg and other synthetic fibers in combination with mercerized yarns, particularly in the hosiery field.

The process is the result of experiment and research to perfect a union dye between Bemberg, which has a high affinity for dye, and mercerized yarns. Further information is available upon request.

Sulfur Dyestuffs

German Patent No. 478,351 (21/VI/'29) (*addition to G. P. No.* 477,698 *of* 1/VII/'27)—*I. G. Farben-Ind. A.-G.*—The original patent prescribes the heating of binaphthylene dioxide with sulfur. This present addition employs sulfur halides instead of sulfur, with or without diluting agents or solvents. The present process also covers the use of sulfur in addition to the sulfur halides.

The products are similar to those obtained by the original process, dissolving easily in sodium sulfide solution to form orange to red vats, which dye cotton the same colors; upon oxidation in the air, the dyeings pass to reddish and violet browns.

Four examples are given.

● SHRINKAGE

A proposed standard specification for the shrinkage of woven cotton yarn goods will be reported early in November to a conference of textile trade and technical associations, it was disclosed recently by the American Standards Association.

The Textile Shrinkage Conference of the New York Board of Trade developed the proposed specifications for cotton goods sold as "pre-shrunk" after two years of work.

The problem of informing the converter, garment manufacturer, distributor, and retail purchaser of the garment just what amount of shrinkage to expect, was submitted to a subcommittee appointed last year. After a number of meetings, this group has reported its findings to the general conference called by the ASA.

Details of the specifications provide methods for determining shrinkage and further require that the maximum amount of shrinkage shall be stamped on or firmly attached to the fabric. To cover the cases of special fabrics, where different amounts of shrinkage in warp or filling are necessary, provision is made for separately designating these facts.

The committee follows:

Wm. D. Appel, National Bureau of Standards.

Oscar Berman, Union Made Garment Manufacturers Association.

Robert S. Dempsey, Association of Cotton Textile Merchants of N. Y.

Ephraim Freedman, American Society for Testing Materials, American Association of Textile Chemists and Colorists and National Retail Dry Goods Association.

M. Leo Gitelson, Textile Fabrics Association.

Frank A. Lester, National Association of Finishers of Textile Fabrics.

Ruth O'Brien, U. S. Bureau of Home Economics and American Home Economics Association.

H. B. Robbins, Laundryowners National Association of the U. S. and Canada.

H. G. Zervas, National Association of Finishers of Textile Fabrics.

Among the technical groups which have made intensive studies of various phases of the problem of shrinkage of woven cotton yard goods are the National Retail Dry Gods Association, American Association of Textile Chemists and Colorists, National Federation of Textiles, American Society for Testing Materials, and New York Board of Trade.

Consumers have been represented by the U. S. Bureau of Home Economics and other Government agencies, General Federation of Women's Clubs, American Home Economics Association, Laundryowners National Association of the U. S. and Canada, and other groups.

Many corporations and groups in the manufacturing, processing and distribution of fabrics and garments have been working on the problem in recent years. The Textile Shrinkage Conference has used much of this independent work in developing the proposed standard.

Research into the shrinkage of fabrics led the American Association of Textile Chemists and Colorists to adopt a method for determining the shrinkage in cotton fabrics, some years ago. Although based upon previous methods, this scheme obtained more concordant results, and less laboratory manipulation and time were required. The essentials of this test were incorporated into the Federal Specifications for Textiles; Test Methods (CCT-T-191, May 2, 1933) which is used by the Government in purchasing textiles.

Conferences with the National Bureau of Standards and the two textile technical societies resulted in complete agreement in adoption of these tests early in 1934. Several trade associations then adopted this test method as official. After it was adopted by the American Society for Testing Materials, it was approved as an American Standard by American Standards Association.

Upon this work was based, to a large extent, the present Proposed Standard Specification for Shrinkage of Woven Cotton Yard Goods.

● NEW PATENTS

(*Abstracted by S. O. C. M. A.*)

Azo Dye and Process of Preparing Same. (Using, for example, amino-hydroquinone-dimethyl-ether as the coupling medium and p-toluidine as the diazo compound; especially adapted to dyeing acetyl cellulose, yielding from an acid bath bright greenish yellow shades of a very good tinctorial power; on diazotizing on the fiber and developing with beta-naphthol a bright bluish scarlet is obtained; with resorcin a full orange-brown; and with beta-oxynaphthoic acid a deep bluish Bordeaux. The dyeings are fast to washing and light and give a pure white discharge.) Henry Jordan and Miles Augustinus Dahlen, Wilmington, Del., assignors to E. I. duPont de Nemours & Co., Wilmington, Del., No. 1,963,133, June 19, 1934.

Production of Quinoline Yellow Bases. (By the condensation of phthalic anhydride with quinaldine, comprising the improvement of removing impurities from the quinoline yellow base in the form of a solution in a chlorbenzene.) James Ogilvie, Buffalo, N. Y., assignor to National Aniline & Chemical Co., Inc., N. Y., N. Y., No. 1,963,374, June 19, 1934.

Nitration of N-Acetyl-P-Toluidine. (Relates to the manufacture of m-nitro-p-toluidine [3-nitro-4-amino-1-toluene]). John M. Tinker and Louis Spiegler, So. Milwaukee, Wis., assignors to E. I. duPont de Nemours & Co., Wilmington, Del., No. 1,963,597, June 19, 1934.

Manufacture of 5-Nitro-2-Amino-Anisole. (Or 5-nitro-2-anisidine.) John M. Tinker and Louis Spiegler, So. Milwaukee, Wis., assignors to E. I. duPont de Nemours & Co., Wilmington, Del., No. 1,963,598, June 19, 1934.

Process of Making Chlorobenzene. (Comprises passing a mixture of benzene vapor, hydrogen chloride and air at a controlled temperature over a catalyst containing copper and iron.) Walter Prahl, Ludwigshafen-on-the-Rhine, Bavaria, Ger., assignor to F. Raschig G.m.b.H. Ludwigshafen, Ger., No. 1,963,761, June 19, 1934.

Production of Artificial Masses. (More specifically, comprises condensing a urea and formaldehyde to a methylol urea in the presence of anorganic substance containing a free hydroxyl group and at least one further substituent selected from the class consisting of halogen and hydroxyl.) Wilhelm Pungs, Karl Eisenmann, and Erich Scholz, Ludwigshafen-on-the-Rhine, and Theodor Kollmann, Mannheim, Ger., assignors to I. G. Farbenindustrie Aktiengesellschaft, Frankfort-on-the-Main, Ger., No. 1,963,762, June 19, 1934.

Vinylethinyl Derivatives and Processes for Producing Same. (More particularly vinyl acetylides, prepared by treating monovinyl acetylene with an alkali metal or an alkali metal amide.) Wallace H. Carothers, Fairville, Pa. and Ralph A. Jacobson, Wilmington, Del., assignors to E. I. luPont deNemours & Co., Wilmington, Del., No. 1,963,934, June 19, 1934.

Vinylethinyl Derivatives and Process for Preparing Same. (Pertains particularly to vinylethinyl magnesium compounds and to new and useful products obtained therefrom.) Wallace H. Carothers, Fairville, Pa., and Gerard J. Berchet, Wilmington, Del., assignors to E. I. duPont deNemours & Co., Wilmington, Del., No. 1,963,935, June 19, 1934.

Purification of Esters. (More particularly a process of removing the aldehydes or substantially lowering the aldehyde content of aldehyde-containing lower alkyl esters of lower fatty acids, by bringing such esters into contact with an amino compound.) Joseph P. Burke, Highland Park, and Carrol A. Doran, Parlin, N. J., assignors to E. I. duPont deNemours & Co., Wilmington, Del., No. 1,963,968, June 26, 1934.

Sulfur Dyestuff Preparation. (A dyestuff printing paste comprising a reduced sulfur dyestuff, glycerine, a hydrotropically acting agent and anthraflavine acid; a divisional application of co-pending application Ser. No. 496,558, filed November 18, 1930). Herman Berthold, Leverkusen-I. G. Werk, Ger., assignor to General Aniline Wks., Inc., N. Y., N. Y., No. 1, 964,309, June 26, 1934.

Azo Dyes and Methods for Their Preparation. (For example, comprises coupling diazotized amino-terepthalic acid with 1-naphthylamine-7-sulfonic acid, diazotizing the resulting amino-azo compound and coupling it with amino-hydroquinone-dimethyl-ether, diazotizing the resulting amino-disazo compound and coupling it with para-amino-benzoyl-1-amino-8-naphthol-4-sulfonic acid; dyes have excellent stability to washing and light, imparting bright attractive colors to cotton, particularly in the various shades of green and may be developed on the fiber, and readily discharged.) Arthur Rowan Murphy, Penns Grove, N. J., assignor to E. I. duPont deNemours & Co., Wilmington, Del., No. 1,965,201, July 3, 1934.

Method of Preparing Cellulose Acetates. Van L. Bohnson, Waynesboro, Va., assignor to duPont Rayon Co., N. Y., N. Y., No. 1,966,579, July 17, 1934.

● GENERAL RELEASES

The General Dyestuff Corp. announces the following releases, copies of which are available upon request.

Naphtol AS on Cotton Yarn—the title of a new card which illustrates a large number of Naphtol combinations with their principal fastness properties.

Acid Alizarine Flavine RA — a new chrome yellow which produces a bright reddish yellow when dyed according to the usual chrome-topped method. Properties claimed for this product are as follows: very good fastness to light, level dyeing, meets fastness requirements for light and medium fulling, and fastness to carbonizing, steaming and hot pressing, washing, perspiration and salt water is very good to excellent. It is said that this dye is very suitable for combination shades especially on yarn and piece goods. Effect threads of cotton, rayon and acetate in piece goods are unstained. This dyestuff may also be applied by the chromate process.

Indanthrene Red Brown RR Paste—recommended by the distributors only for dyeing purposes. It is said to yield full reddish brown shades on cotton, rayon and silk of excellent fastness to light, weather, washing and chlorine. It is of very good solubility and is best dyed according to the IW process.

Celliton Discharge Violet B—a new dischargeable violet for acetate which can also be used for direct printing.

Rapidogen Red ITR—said to have a very clear shade and to possess very good fastness properties. It is recommended by the distributors as a pink in light shades and is said to possess the same fastness to light as vat colors.

Eunaphtol AS—a product which is used for pasting up and dissolving the entire range of Naphtols, and in a single product is said to combine the good qualities of a large number of auxiliaries recommended for this purpose. It is also said to possess excellent resistance to lime, a very high protective colloid action and very good wetting out properties. It is further stated that it prevents floating of material and has a favorable influence on the fastness to rubbing of the dyeings as well as on the strength and clearness of shade.

Naphtol AS-L4G—the latest addition to a series of yellow Naphtols, which, in combination with suitable bases or diazo salts, is said to produce clear shades from a greenish to a reddish character of exceptional fastness to light, washing, chlorine and peroxide. The most important coupling agents are Fast Yellow GC, Fast Red KB, Fast Scarlet GG and Fast Orange RD. The new Naphtol is of low substantivity, readily soluble and excellently suited for the padding method at a temperature of 120° F. The new yellows are said to be the first Naphtol yellows which can be discharged to a white.

The Foreman Dyer*

His Past, Present and Future

By **E. F. MANOR**

(Concluded from page 600, October 22nd issue)

The Attitude Towards Degrees

Some people are inclined to make a fetish of a degree, while others are inclined to be sarcastic about it. The latter justify themselves by saying that no university degree can make a practical man. This is particularly true about dyeing. On the other hand, there are some very strong considerations in favor of a degree. Provided it is the criterion of a course which has adequately dealt with the subject it *is* a guarantee, as near as is humanly possible, that the holder is adequately equipped on the scientific side of the subject. Also, it is really the only way of giving a man his hall mark. There is no other competitive method to choose for standardizing purposes.

The Foremen Dyers' Guild rule as to membership reads: "Class A. Members shall consist of foremen dyers only, who shall have held their present situation twelve calendar months and shall be competent to manage the department they profess." Under the circumstances, we fail to see how the rule could be improved. It is a reasonable presumption that if a man has been a foreman of a department for a year he has proved himself. What better way is there of proving you can do a job than by doing it? From the practical point of view, it is the only way.

But some jobs are simple. Others need the highest degree of skill. The F.D.G. rule only guarantees that a man is competent for the job he is actually in. Let him have to change that job and his membership is no criterion as to his equipment for tackling new conditions. Under present circumstances, a firm wanting a new dyer has to study each candidate separately and very fully. This would be so, probably, under any conditions. But the existence of a degree would help. It would be, in itself, a proof that the man had the scientific equipment for meeting new conditions—the one thing the rule of thumb man lacks.

The New Dyer Always a Dark Horse

Always it would have to be remembered that the gift of quick matching to shade is a personal matter. In this respect, all new dyers are dark horses—to the dyer himself the new job is a dark horse. We do not see the remotest chance of making this unknown factor a measurable or prophesiable thing. Lack of appreciation of this fact is at the bottom of the demand for "fully qualified" dyers. For evidently, the criterion of "fully qualified" in the minds of these seekers after new foremen dyers is that the required man would do perfect work straight away, and ever afterwards! It would be easier to make an automatic machine for adding dye according to the requirements of the shade than to train the human organism to an automaton perfection. Maybe apparatus of the kind suggested will, sometime, be produced, but meanwhile we must accept things as they are.

Tyranny of Non-Technical Men

The problem of matching to shade will, in fact, have to be tackled from another direction. It has been imposed on the trade by non-technical persons, retailers, merchants and commercial men, who have little idea of the technical difficulties. They have worked on the idea that the thing is easy to do—so easy that they very glibly label anything short of perfection as incompetence. It has brought a further evil in its train that may ultimatety lead to a revolt of the trade that will bring the non-technical persons to reason—namely, the multiplication of lots, with a consequent reduction in the size per lot and a terrible, enormous increase of expense. The dyer expects trouble and worry—it is his normal atmosphere. He will bear up—as long as he is solvent. But when all financial reward is gone then he can tell his tormentors to go to—the Temple of Meditation (not that this is the destination *he* would suggest). Certainly, small lots, every one carrying a demand for perfect matching to shade, have just about eaten up the dyer's profits. The trade has reached—*reductio ad absurdum*—the obvious remedy is some sort of rationalization.

"One Big Machine"

There were some articles in *The Dyer* recently, suggesting "One Big Machine for the Wool Dyeing Trade." In this heroic scheme, the problem of matching to shade was solved by the simple process of removing the business altogether—to the process of carding. Whether the scheme is feasible in regard to the wool dyeing trade may be left—to the wool dyeing trade (where it will undoubtedly be left—high and dry).

Another way out, applicable to all textile trades, would be a reversion to the old methods existing before the tyranny of the sellers of goods over the makers of goods became as complete as we know it to-day. In the old days, cloth was made and then sold for what it was. The makers did not leave the judging of market require-

*Reprinted from *The Dyer*.

ments to merchants or retailers. They did not make "to pattern." They made—and sold. Such a reversion may need a 100 per cent. combination of manufacturers, or it may be done by a display of enterprise and initiation by individual firms. The reduction in cost—and therefore in selling price—ought to carry it through. In the wallpaper trade, you must buy enough at once to satisfy your requirements, otherwise you are not guaranteed an exact match to your first purchase. It is an entirely parallel case. Let the textile trade imitate it.

However, the particular way in which rationalization would solve the difficulty is not the subject under discussion. It is enough to say that this matching to shade trouble is essentially artificial and can be remedied by artificial means; and the sooner the better. It can *not* be solved by some "full qualification" of foremen dyers, because the difficulty here is not artificial but inherent in human nature.

A hall-mark of adequate scientific equipment can be conferred by a degree. The criterion of competence—up to a point—is expressed as well as a generalized but brief form of expression can do it in the F.D.G. rule quoted. Beyond that it is impossible to do anything that would be at once definite and of general application.

The City and Guilds Exams

Of course, it may be said that scholastic qualifications have been in existence for years. The City and Guilds of London Institute examinations have actually provided the essentials of a dyeing degree—without the name. What's in a name? Practically, in the present case, all the kudos is in a name—which isn't there! The question is, how to provide it? The Society of Dyers and Colourists, being purely a scientific society, seems the likeliest of the trade's associations to do it. Or it could decide on a course of instruction, and if this course were adopted uniformly by the technical schools and universities then a useful standardization would be achieved. The City and Guilds Institute has the machinery of examinations in existence. By one way or another, a degree seems part of the inevitable evolution of the trade. The means to its adoption seems to be lying to hand and only need coordinating.

One result of the institution of a degree would be—at least we hope so—to stop the unfortunate clash between dyers and chemists. Instead of two classes we should have one—Dyer Chemists, corresponding to the already organized Pharmaceutical Chemist and the Analytical Chemist. At present, we often find the rather incongruous arrangement of a dyer plus a chemist which is much as if a motor car were driven by a stable lad with a mechanic in the back seat in case of accidents. One experienced mechanic-chauffeur would give better results.

But remember—the most skilful mechanic-chauffeur might still have accidents and the stiffest degree would not, could not, confer perfect matching-off powers.

A Suggestion to the F.D.G.

Meanwhile, we might make a suggestion to the F.D.G. In regard, at any rate, to *new* members, the definition of qualification for membership (Rule 3) might be added to, by a statement that the member must have passed one or more of certain examinations (e.g., those of the City and Guilds of London Institute or of specified Technical Schools) which the F.D.G. consider an adequate criterion of a scientific training in the principles of the trade. The status of the members, in the eyes of the trade, would be raised and the assumption of judgment on schools, etc., would increase the prestige of the society. The double qualification for membership—science training and the actual management of bulk dyeing—would be as near as could be reached to that desideratum "fully qualified."

Foremen Not Treated Fairly

One point we wish to reiterate in closing. We have shown how and why foreman dyeing has become largely a blind-end profession. In the matter of promotion beyond sectional foremanship, foremen dyers have not been treated fairly. Unless there is more assurance that foremen dyers' jobs lead to promotion there will be reluctance to enter the trade. Especially will this be the case if something corresponding to a university degree is going to be made a *sine qua non*. What parent is going to the expense of a university degree for his son if the odds are against that son rising to the highest positions in the trade?

We think that sooner or later the need for technical expertness in the higher administrative posts of the trade will be overwhelming. The sooner the dyeing trade realizes this the better for all the textile trade. If the trade offers greater chances for promotion it will draw to it more highly educated men. As it is such a key position trade it is of great importance that it should have the best possible service—and should want the best brains to do it with. Any suggestion for increasing the skill and status of its experts ought, therefore to have careful consideration.

● WELFARE COMMITTEE

Harry L. Derby, president of the American Cyanamid and Chemical Corporation, has accepted the chairmanship of the Chemical and Paints division of the Commerce and Industry committee of the Citizens Family Welfare Committee, it has been announced.

"I am glad to cooperate in this worthy appeal again this year for the necessity of rehabilitating our less fortunate neighbor so he may become self-sustaining is as great this year as in former years," Mr. Derby said in accepting the chairmanship.

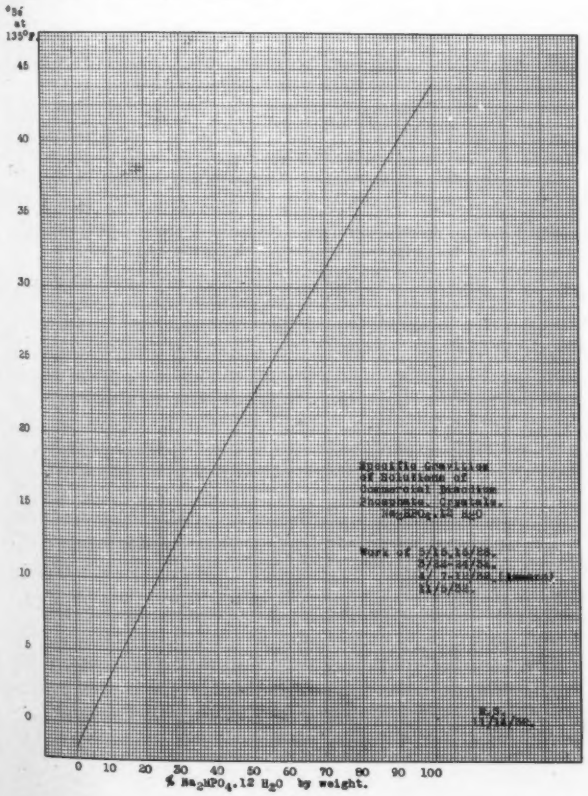
"J. L. Schroeder, vice-president of A. Klipstein and Company, has assured me that he will again serve as vice-chairman of the division. Among the other mem-

bers of last year's committee who I am sure will aid in putting over the objective of the Chemical and Paints division are George A. Anderson, of Charles Pfizer Company, Inc.; Horace Bowker, president of the American Agricultural Chemical Company; Charles L. Gabriel, of the Commercial Solvents Company; R. C. Gaugler, of the American Cyanamid and Chemical Corporation; William S. Gray, of William S. Gray and Company; E. K. Halbach, president of the General Dyestuff Corporation; Herman Johns, of the Grasselli Chemical Company.

"Also L. S. Kohnstamm, of H. Kohnstamm and Company, Inc.; A. Lichtenstein, of Ciba Company, Inc.; A. L. Loebenberg, vice-president of Barrett and Company; Eugene L. Norton, president of the Freeport Texas Company; Sidney V. Smith, of Binney and Smith; Fred L. Somers, Jr., of the Lavanburg Company and Holland R. Wemple, of the Texas Gulf Sulphur Company, Inc."

• COMMERCIAL DISODIUM PHOSPHATE CRYSTALS

The accompanying table giving data in regard to solutions of commercial disodium phosphate crystals, also a curve giving a graphic representation of the same will undoubtedly prove useful to textile chemists and finishers. This table is published through the courtesy of R. Schmeidler of the United Piece Dye Works (Weidmann Division) who originally compiled the table, and the Van Nostrand Company who have already published it in their Chemical Annual.



Commercial Disodium Phosphate Crystals

$Na_2HPO_4.12\ H_2O$

Aqueous Solutions at 57° C. (134°.6 F.)

°Bé	Specific Gravity	%	Lb. per Gal.
0	1.0000	3.5	0.29
1	1.0069	5.5	0.47
2	1.0140	7.5	0.64
3	1.0211	9.5	0.81
4	1.0284	11.5	0.99
5	1.0357	13.5	1.17
6	1.0432	15.5	1.35
7	1.0507	17.5	1.53
8	1.0584	19.5	1.72
9	1.0662	21.5	1.91
10	1.0741	23.5	2.11
11	1.0821	25.5	2.30
12	1.0902	27.5	2.50
13	1.0985	29.5	2.71
14	1.1069	31.6	2.92
15	1.1154	33.7	3.14
16	1.1240	35.8	3.36
17	1.1328	37.9	3.58
18	1.1417	40.0	3.81
19	1.1508	42.1	4.04
20	1.1600	44.2	4.28
21	1.1694	46.4	4.53
22	1.1789	48.6	4.78
23	1.1885	50.9	5.05
24	1.1983	53.2	5.32
25	1.2083	55.5	5.60
26	1.2185	57.8	5.88
27	1.2288	60.1	6.17
28	1.2393	62.4	6.46
29	1.2500	64.7	6.75
30	1.2609	67.0	7.05
31	1.2719	69.3	7.36
32	1.2832	71.6	7.67
33	1.2946	73.9	7.98
34	1.3063	76.2	8.31
35	1.3182	78.5	8.64
36	1.3303	80.8	8.97
37	1.3426	83.1	9.31
38	1.3551	85.4	9.65
39	1.3679	87.7	10.01
40	1.3810	90.0	10.37
41	1.3942	92.5	10.76
42	1.4078	95.0	11.15
43	1.4216	97.5	11.56
44	1.4356	100.0	11.98

OPEN FORUM

Rules under which this department of the REPORTER is conducted are as follows:

1. Anyone who has a technical problem on which he would like advice may submit it to the Reporter and it will be published in the first available issue.

2. Any reader who feels that he has a solution of the problem may forward his reply to us and if we feel that the reply is suitable it will be published in a succeeding issue.

3. For each such reply published the Reporter will pay a minimum of $2.

4. In case there is more than one answer to the same question, the one covering the subject in the most complete and authentic manner will be published, or if two answers are sufficiently different both will be published. If two answers are considered equally good, the one first received will be given priority.

5. The Reporter will assume no responsibility whatsoever for the accuracy of the answers submitted—it is simply offering a vehicle for the public expression of its readers' opinions.

6. Both the questioner and answerer must send in his complete name and address. When requested we will publish only the initials or other identifying insignia.

Answers

14—Can you give me any information regarding what has been done in the development of ramie for use as a textile fiber? Do you think there is any market for it and for what uses is it particularly adaptable?—R. M.

Answer No. 3:—Processed ramie fiber is of remarkable strength and fineness, has a silky luster and is a good white color. In view of these characteristics, many attempts have been made to utilize the fiber in various textiles, but for one reason or another, the results of these trials have not generally been pursued in practical usage. Ramie fabric has frequently been advocated as a packing fabric for raw wool and cotton stock, etc. This proposal has not been taken up possibly because stray ramie fibers in goods manufactured from the material in the bales would give undesirable effects in the fabric, etc. and possibly prove troublesome to get rid of.

Ramie, rhea, or China grass as it is variously termed, has been used for sailcloth in native craft for ages. Ramie sailcloth was experimented with by American and European yachtsmen in the latter part of last century, a good deal of the yarn being processed in Ireland, later to be shipped to the United States for weaving. It was thought that ramie sailcloth would be first rate for racing craft since the fabric can be woven so densely as to be of excellent windtightness. However, after being in use for a while, it was found that ramie sails became covered with a dense fur or pile consisting of loose ends of fiber and as this was considered detrimental to the speed of the craft since it increased the friction as the wind streamed over the piliated surface, ramie sailcloth dropped out of use. Later on, an improved fabric was introduced, this consisting of a construction embracing cotton warp and ramie weft. This material found some users, but we cannot say whether it is still manufactured.

Effect or illuminating threads of ramie have found their occasional uses in woolen and worsted fabrics. The ramie has been used both in the white and colored condition. We have seen examples of a kind of prepared ramie fiber which were offered some ten years ago as a cheap substitute for sheeps' wool in the manufacture of textiles. The appearance of a handful of this ramie material resembled sheeps' wool but it handled more harshly. The fiber lost all its loftiness when wetted and never recovered it again. Moreover, its admixture with wool in more than minute amounts interfered with fulling and the processed cloth was distinctly low grade stuff into the bargain.

The chief competitor of ramie in the manufacture of cheap packing fabric would appear to be jute. Even in the matter of appearance, some folks might prefer the natural and not unpleasing brown color of jute packing fabric to the pure white of ramie. Moreover, a white packing fabric used for sacks, etc., in continual use would soon present a grimy appearance which might prove detrimental to the sale of enclosed goods whereas jute bagging stands considerable soiling before it appears bedraggled.

We should think that ramie fabric when tarred would serve for packing coals and other heavy minerals just as well as the tarred jute sacks in common usage in countries where coal is retailed in small quantities by door to door salesmen. Further to this, ramie twine ought to be as good as tarred jute for horticultural purposes. The deciding factor may be entirely one of cost. Another likely use of ramie fabric of close weave would be for truck and hay rick covers, after waterproofing in some suitable manner. A stout ramie truck cover would probably be far more flexible in handling than a cotton cover. Lastly, the whiteness of ramie fabric might render it a suitable material for flour and sugar, etc., containers and in fact, an elegant protective for edible commodities generally.—J. Cowlersley.

18—We are interested in obtaining information regarding the prevention of wince marks or mill creases on worsted serges dyed by after-chrome method; weight of serges ranging from 12 to 20 ozs.

Some of the operating variables we have tried out

are as follows:—Before the dyeing operation the serges have been tacked, crabbed, scoured, then crabbed again, then "set" on rolls from 10 to 24 hours. This complete operation is not now being carried out.

We have dyed pieces both tacked (face in) and untacked and in order to avoid overcrowding have dyed only two to four pieces in a six-piece dyeing kettle. We have entered the serges into water (scaife) at 90° F. and taken anywhere from 40 minutes to two hours to bring the kettle to the boil and in washing off have taken from 1½ to 2 hours to cool pieces down before removing them from the kettle. The pieces are dried immediately and do not lay around in trucks. We have varied the speed at which the pieces pass through the dyebath; we have used a flat reel and also a reel with "humps" or spreaders. We have checked the soap used in scouring and run extraction tests on pieces before and after dyeing; also boiled the pieces in ammonia solution before dyeing.

Is this fault in the serge primarily due to the quality of stock and the setting adopted during the weaving operation as the heavier the serge and the "harder" the feel, the more easier it tends to mark. Also, we have obtained marked and unmarked serges that were dyed together in the same kettle.—**A. E. P.**

Answer No. 2:—Creases, cracks, or wince marks sometimes give a lot of trouble when processing light weight worsted dress goods, such as the serges querist is handling. The first thing to attend to is efficient crabbing and setting of the fabric. It is essential that at some part of the process the temperature of the goods should for a period of several minutes equal that at which dyeing is conducted, namely, boiling point. The crabbing plant should be of the two bowl type with top weighting and steaming arrangements. The goods should be processed in both bowls of the apparatus, then steamed. Tension of goods passing from bowl to bowl should be sufficient to keep the fabric taut without inducing watering effect in the material. Crabbing must be done in vigorously boiling water. Steaming to be done at no more than nine or ten pounds pressure per square inch lest watering occur. The steaming can should be capable of being rotated during processing; a second steaming in reverse order may be given. Finally, run the fabric through a cooling trough in readiness for scouring.

Where crabbing and setting have not been done properly, cracks will be sure to develop in seemingly perfect goods during processing in a boiling dyebath. Turning now to a discussion of the dyeing operation, we advise querist to process with a dye whose levelling properties permit of its use in a well acidified bath at the start since cracks are very apt to form in cross bred worsted goods during processing in hot neutral liquor containing Glauber salt. If practical trials of our suggestions do not overcome querist's trouble, he might then see what processing of the goods in open width during dyeing will do in the direction of getting a cure. For this, the wince of the kettle will have to be slowed down to 35 or 40 revolutions per minute in order to enable the operative to keep the goods in open order with a light pole. For easier processing, tack three to four pieces selvage to selvage, leaving 6 in. gaps every two yards for liquor circulation. Some amount of practice is necessary before the operative can maintain the fabric in open order when the kettle begins to boil.

However, we do not think open width processing ought to be needed if the goods are properly set during crabbing. One reason why we think your crabbing process is at fault is because you have been getting both cracked and perfect goods out of the same dyeing batch. There is absolutely nothing to gain by taking so long as two hours to bring the dyebath to the boil since even a well set piece of goods can develop cracks through excessive processing in hot liquor. We suggest that you enter the goods into the dyebath at about half-boil, raise to the boil during half an hour, and clear some fifteen minutes later with an appropriate amount of acid, then use the bichrome. Finally, cool down the bath during half-an-hour by admitting cold water, the outlet pipe for this preferably being fixed in the boiling box situated across the front part of the kettle so that cold water does not impinge directly upon the hot goods. If none of these suggestions fail to put you right, write us direct and we will endeavor to help you further. In this event, it will assist if you enclose a yard or two of defective fabric for our inspection, together with remittance for return mail if you desire it returned.—J. Winfred.

Answer No. 3:—The finer the yarn and the closer the weave, the more liable to wrinkles. This can only be prevented before dyeing. Run the cloth after soaping in a fulling mill for about 15 minutes then wash with soap, rinse off the soap partly, using warm water not over 115° F. Soap again for 20 minutes and have a good lather; rinse with warm water 115° F., till the soap is entirely removed. Steam or decate the goods for a few minutes twice, reversing ends, and dye. In dyeing fill the kettle with as much water and cloth as possible, have humps on the reel. Circulate the cloth about 70 yards to the minute. Bring to boil in 1 or 1½ hours according to the weight of the cloth. When dyed cool if possible first with warm water, then cold, until cold. Keep water to a high level and distribute the whole width of the kettle. Would appreciate hearing the result of the trial.—L. F. B.

Unanswered Questions

17—We are in need of mathematical text books on problems pertaining directly to textile printing but so far have been unable to find anything on the subject. If you know of texts or problems in math. especially adapted to this field, I would more than appreciate suggestions.—**O. E. M.**

19.—In earlier editions of the Open Forum, Question No. 4, inquiry was made in regard to the use of Potassium Permanganate for certain processes of bleaching and dyeing.

Two different answers to this question were published in the May 21, 1934 edition of the DYESTUFF REPORTER. As far as I can observe, neither of these answers refer to the possible use of potassium permanganate in the bleaching of wool material and rayon. I assume that the bleaching of viscose rayon would be similar to the bleaching of cotton, but I am not sure how it would work with acetate rayon. If anyone has unsuccessfully tried to apply it for any of these purposes, I would be interested in learning why it was rejected.

Further replies along this line will be appreciated.

20.—We have experienced partial color destroying action in basic color printing. The goods are folded face-to, and stored. The color destroying action is not uniform, showing bars, streaks, and blotches. When the material is baled this does not happen. Unfinished material does not show this result. No change in formulas over a period of years.—**G. O. Linberg.**

● du PONT BOOKLETS

E. I. duPont de Nemours & Co. have just distributed three booklets of general interest. The titles of these booklets are as follows: Bulletin No. 3, Solvent Plasticizers; Gardinol; and Bulletin No. 1, Organic Chemical Specialties. The first and last of these publications are issued by the Organic Chemicals Dept. of the Fine Chemicals Division and the one on Gardinol by the Gardinol Corporation of which the duPont Co. is a selling agent. Copies of these booklets are available upon request.

CLASSIFIED

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

POSITION WANTED—By Philadelphia Textile graduate 31 years old, married, protestant. Experience—At present and for past 6 years, boss dyer in large plant using wool, cotton, rayon and acetate fibers; 2 years apprentice learning wet and dry finishing; 1 year apprentice at wool sorting,—also summer work in dyestuff laboratory. Would like position with opportunity for advancement. Write Box No. 832, merican Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED—Salesman, one who has established trade in the South selling to dyehouses, by manufacturer of oils and finishes. Send complete information with first letter on how long employed in this territory and approximate annual business done, etc. Our employees know of this advertisement. Reply to Box No. 835, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

SALES EXECUTIVE—Not over 35 years old, must have experience in selling and demonstrating Sulfonated Oils, Sizes, Softeners, Textile Oils and Specialties for silk, wool, cotton and rayon, and comprehensive knowledge of consuming demand throughout the country. Must be capable of directing sales organization—one familiar with the actual manufacture preferred. Write giving full particulars, previous experience and salary expected. Unusual opportunity for right party. Address Box No. 836, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED—Salesman with connections in New England textile trade, by dyestuff firm. Sidelines of Oils and Finishes not objectionable. State experience, and terms. Write Box 837, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.